

Nina Gmeiner

## The Value of Resources in Common Property Regimes for Actors' Well-being

A comparative example of seed commons in societies of affluence and scarcity using the capability approach





# Wahrnehmungsgeographische Studien

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Nina Gmeiner

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affluence and scarcity using the capability approach

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## Abstract

Seeds and varieties are frequently managed in commons institutions around the world, referred to as seed commons. From an economic standpoint, transaction costs are high in this property regime and private property seeds have biological and economic efficiency advantages. From this the research question is developed, *In what way do seed commons influence farmer-breeders' individual well-being, visible in the capabilities they enable or inhibit?* The hypothesis is that commons raise the well-being of commoners by providing them with diverse economic, social, ecological and cultural benefits.

This transdisciplinary research approach includes interdisciplinary and farmer-breeder perspectives, directly in knowledge creation, ensuring results which are meaningful to practitioners and relevant to in-depth commons studies. Qualitative interviews are the core research method. Two case studies are conducted between 2017 and 2020: the German breeders' association Kultursaat e. V. and the Filipino small-scale farmers' network MASIPAG. The former is set in affluent conditions, while the latter operates in relative scarcity, allowing for conceptual comparisons of seed commons in divergent settings.

The capability approach is applied as a theory of well-being, measuring well-being through the range of achievable abilities and choices social actors have. It is operationalised to seed commons and revised, after transdisciplinary discussion, to a list of 11 capabilities: (1) control over one's economic future, (2) participation in political decisions, (3) sharing of (seed) knowledge, (4) creativity and critical thinking, (5) bodily health, (6) psychological well-being, (7) giving and receiving support and respect, (8) personal connection to plants and spirituality, (9) beauty in life, (10) living in and with concern for community and (11) working for a human(e) future.

Empirically, results support the hypothesis, as farmer-breeders report their well-being to be enhanced through seed commons. Economic security, health, community support and living in accordance with own values are the main reasons, but emotional and spiritual motives are also reported as central by farmer-breeders. Seed commons follow similar logics and values under conditions of affluence and scarcity, yet they may utilize contradicting practices to

get the same results. Conceptually, these findings illustrate how property regimes as social institutions influence the realities of actors' lives beyond the economic. For commons studies in particular, the importance of commoning aspects is highlighted, as these focus on relational and procedural features. Furthermore, the intertwining of the material base with the configuration of commons institutions is nuanced, as seeds change their material characteristics over time and with modes of maintenance. Politically, it is therefore advisable to keep options for alternative property regimes open: economically, biologically, and legally.

## Zusammenfassung

Weltweit werden Saatgut und Sorten häufig in Commonsinstitutionen verwaltet, sogenannten Saatgutcommons. Aus ökonomischer Perspektive bringen Commonsinstitutionen hohe Transaktionskosten mit sich, während Saatgut in Privateigentumsregimes biologisch und ökonomisch effizienter sind. Die Forschungsfrage ist deshalb *Inwiefern beeinflussen Saatgutcommons das individuelle Wohlergehen züchtender Landwirte, sichtbar durch die Befähigungen, welche sie ermöglichen, bzw. hindern?* Die Hypothese ist, dass Commons das Wohlergehen ihrer Mitglieder (Commoners) steigern, indem sie ihnen verschiedene wirtschaftliche, soziale, ökologische und kulturelle Vorteile bieten.

Der hier gewählte, transdisziplinäre Forschungsansatz bezieht interdisziplinäre und bäuerliche Perspektiven direkt in die Wissensgenerierung ein und gewährleistet so Ergebnisse, die für Praktiker aussagekräftig sind und in die Commonsforschung einfließen. Qualitative Interviews sind die zentrale Forschungsmethode. Zwei Fallstudien werden zwischen 2017 und 2020 begleitet: der deutsche Züchterverband Kultursaat e. V. und das philippinische Kleinbauernnetzwerk MASIPAG. Die Mitglieder des ersteren agieren in Wohlstandsbedingungen, des letzteren unter relativer Knappheit, was einen konzeptionellen Vergleich von Saatgutgemeinschaften in unterschiedlichen Kontexten ermöglicht.

Der Capability-Ansatz wird als Theorie des Wohlbefindens angewandt und misst dieses anhand des Umfangs erreichbarer Fähigkeiten und Wahlmöglichkeiten (engl.: capabilities), welche die Akteure haben. Er wird für Saatgutcommons operationalisiert und nach transdisziplinärer Diskussion zu einer Liste von 11 Fähigkeiten überarbeitet: (1) Kontrolle über die eigene wirtschaftliche Zukunft, (2) Beteiligung an politischen Entscheidungen, (3) Austausch von (Saatgut-)Wissen, (4) Kreativität und kritisches Denken, (5) körperliche Gesundheit, (6) psychologisches Wohlbefinden, (7) Unterstützung und Respekt geben und erhalten, (8) persönliche Verbindung zu Pflanzen und Spiritualität, (9) Schönheit im Leben, (10) Leben in und mit der Gemeinschaft und (11) Arbeiten für eine menschliche Zukunft.



Die empirischen Ergebnisse stützen die Hypothese, da Landwirte und Züchter berichten, dass sich ihr Wohlbefinden durch ihre Beteiligung an Saatgut-commons gesteigert hat. Wirtschaftliche Sicherheit, Gesundheit, gemeinschaftliche Unterstützung und ein Leben in Übereinstimmung mit den eigenen Werten sind die Hauptgründe, aber auch emotionale und spirituelle Motive werden von den züchtenden Landwirten als zentral beschrieben. Saatgut-commons folgen unter den Bedingungen von Wohlstand und Knappheit ähnlichen Logiken und Werten, wenden jedoch mitunter entgegengesetzte Praktiken an, um die gleichen Ergebnisse zu erzielen. Aus konzeptioneller Sicht verdeutlichen diese Ergebnisse, wie Eigentumsregelungen als soziale Institutionen die Lebenswirklichkeit der Akteure über das Ökonomische hinaus beeinflussen. Für die Commonsforschung wird insbesondere die Bedeutung von Commoning-Aspekten hervorgehoben, da diese sich auf relationale und prozessuale Aspekte konzentrieren. Darüber hinaus wird die Verflechtung der materiellen Basis mit der Konfiguration von Commons-Institutionen nuanciert dargestellt, da Saatgut seine materiellen Eigenschaften im Laufe der Zeit und mit der Art seiner Verwaltung verändert. Politisch ist es daher ratsam, Möglichkeiten für alternative Eigentumsregime ökonomisch, biologisch und rechtlich offen zu halten.

## Acknowledgements

When I presented parts of my research in a Science Slam a few years back, I was asked why I became a scientist. “I get paid to ask questions and be curious and that is the greatest thing there is”, I answered. That is only half true. Equally as exciting, was the opportunity to discuss and exchange opinions on seed commons, well-being, property, communities, socio-ecological sustainability, sovereignty, and the future of societies in general with colleagues, friends, and family. I acknowledge all of you here.

My deepest gratitude and appreciation goes to my supervisor Stefanie, who has put together the incredibly interesting research project *RightSeeds*, took care that it had comfortable and well equipped research positions, managed it passionately and in a structured way, and patiently encouraged me in my work throughout all these years. Thank you, Steffi, you had a great impact on my development as an academic and it was a pleasure working, discussing, and teaching with you. My heartfelt thanks as well to all my colleagues in *RightSeeds*, you made sure our research never felt too much like working.

Thank you, Hendrik, without you I would have started this thesis, but I would never have finished it. Our writing weeks are easily some of my most cherished memories in my life as a researcher: the one with the ping pong, the one with the wall maps, the one with the facts and figures blackout and the one with the forest walks. Thank you for being a steady friend, as well as an intellectual, organisational and didactic resource.

A lot of personal support came from my family, partners, and flatmates. You were all there for me in your very own way and showed me that my project was important to you. Thank you, Verena, for believing in me and letting me know that what I do is valuable. Thank you, Miziesky, for steadily caffeinating me and reminding me that there still is a world beyond my desk. Thank you, Tim, for wild discussions and the sharing of intricate academic lists. Thank you, Marcel, for never-ceasing encouragement. And thank you, Γατουλινδο, for sunny correction days and, most of all, for finally making me want to finish, because nothing feels as exciting as having the freedom to start new stories together.

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## List of Abbreviations

BT	Bacillus thuringiensis
BUF / NBUF	(national) backup farm (of MASIPAG)
CBD	Convention of Biological Diversity
CC	Creative Commons
CIMME	Collection, Identification, Maintenance, Multiplication and Evaluation (of MASIPAG)
CMS	cytoplasmatic male sterility
CRISPR/Cas.	Clustered Regularly Interspaced Short Palindromic Repeats
CSS	European Campaign for Seed Sovereignty
DIFS	Diversified and Integrated Farming System (of MASIPAG)
DNA	Desoxyribonuclein acid
DUS	distinctness, uniformity and stability criteria derived from the UPOV convention
e. V.	Eingetragener Verein (German legal term for associations)
ErhaltungV	German act on conservation varieties (Erhaltungssortenverordnung)
EU	European Union
ExeCom	National Executive Committee (of MASIPAG)
F1	Filial Generation 1
FAO	Food and Agriculture Organization of the United Nations
FBRs	farmer-bred rice varieties (MASIPAG)
FDAT	Farmer Developed/Adapted Technologies (of MASIPAG)
GDP	Gross domestic product
GenTG	Gentechnikgesetz
GM	genetically modified
GMO	genetically modified organism
IAD	Institutional Analysis and Development framework by Ostrom
ICT	information and communication technologies
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPC	Philippine Intellectual Property Code
IPCC	Intergovernmental Panel on Climate Change
IPES-Food	International Panel of Experts on Sustainable Food Systems
IRR	Implementing Rules and Regulations (supplement to the Philippine RA)
IRRI	International Rice Research Institute
IT-PGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture (also called Seed Treaty)
MASIPAG	Magsasaka at Siyentipiko Para sa Pag-unlad ng Agrikultura (Tagalog; English translation: Farmer-Scientist Partnership for Development)
NGO	Non-Governmental Organization
OSSI	Open Source Seed Initiative
PatG	German patent law (Patentgesetz)
PBRs	Plant Breeders Rights
PCB	Provincial Consultative Body (of MASIPAG)
PhilRice	Philippine Rice Research Institute
PO	People's Organizations (of MASIPAG)
PVP	Philippine Plant Variety Protection Act
RA	Philippine Seed Industry Development Act
SaatG	German seed trade law (Saatgutverkehrsgesetz)
SES	Simplified Evaluation Sheet (of MASIPAG)
SES	Socio-Ecological Systems framework of Ostrom and Cox
SortSchG	German variety protection law (Sortenschutzgesetz)
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
TRVs	traditional varieties (MASIPAG)
UPOV	Convention of the International Union for the Protection of New Varieties of Plants
US	United States
VCU	Value of Cultivation and Use (addition to the UPOV DUS criteria)
WTO	World Trade Organization

## Vorwort

Das Forschungsfeld der Commons hat in den letzten Jahren merklich an Aufmerksamkeit gewonnen. Verstanden als eine Praxis, bei der, vereinfacht formuliert, mehrere Menschen gemeinschaftlich ein gemeinsam genutztes Gut bewirtschaften, geht vom Gedanken der Commons eine unübersehbare Faszination aus, die inzwischen längst über den rein wissenschaftlichen Diskurs hinausgeht. Dies mag nicht zuletzt in der Tatsache begründet sein, dass ihre Wurzeln weit in die Allmende- bzw. Gemeingüterwirtschaft vorindustrieller Gesellschaften zurückreichen. Trotz oder gerade deswegen wird Commons heute von verschiedenen Seiten eine potenziell tiefreichende sozial-transformative Wirkung zugeschrieben, wie sie für den Umgang mit den ökologischen, sozialen und wirtschaftlichen Krisen des 21. Jahrhunderts benötigt würde.

In der vorliegenden Arbeit richtet Nina Gmeiner den Blick auf einen sehr speziellen Bereich der Commons, die gemeinschaftliche Züchtung und Bereitstellung von Saatgut. Saatgut ist ein basaler Baustein der globalen Landwirtschaft. Weltweit werden Saatgut und Sorten sehr häufig in Commons-Institutionen verwaltet, sogenannten Saatgutcommons. Das Interesse der Verfasserin gilt dabei in besonderer Weise den Auswirkungen, die die Mitwirkung an solchen Saatgutcommons auf das individuelle Wohlergehen – sichtbar in den Befähigungen, die die Commons ermöglichen oder auch behindern – der beteiligten Züchter:innen und Landwirt:innen hat.

Einem transdisziplinären Forschungsansatz folgend, hat Nina Gmeiner mittels zahlreicher qualitativer Interviews differenzierte Einblicke in Leben und Arbeit von Landwirt:innen und Züchter:innen gewinnen können. Hierfür boten ihr zwei Fallstudien geeignete Möglichkeiten: eine in Deutschland und eine auf den Philippinen. Mit ihrer unterschiedlichen Einbettung in Bedingungen des Wohlstands auf der einen und Bedingungen relativer Knappheit auf der anderen Seite eröffneten die Fallstudien zusätzliche Möglichkeiten eines konzeptionellen Vergleichs von Saatgutgemeinschaften in unterschiedlichen sozialen, wirtschaftlichen und politischen Kontexten.

Die Ergebnisse ihrer empirischen Erhebungen stützen die Hypothese der Verfasserin, dass die Mitwirkung an Saatgutcommons das Wohlbefinden der

Beteiligten deutlich gesteigert hat. Zu den beschriebenen Aspekten des Wohlergehens, so die Interviews mit Züchter:innen und Landwirt:innen, zählen wirtschaftliche Sicherheit und Gesundheit ebenso wie die Unterstützung durch die Gemeinschaft und ein Leben in Übereinstimmung mit den eigenen Werten. Dies gilt gleichermaßen für die Erfahrungen unter den Bedingungen des Wohlstandes als auch der Knappheit. Die Befunde lassen deutlich werden, wie Eigentumsregelungen die Lebenswirklichkeit von Menschen weit über das Ökonomische hinaus positiv beeinflussen können. Vieles spricht insofern dafür, Möglichkeiten für die Gestaltung alternativer Eigentumsregimes offen zu halten, um damit Menschen geeignete Gestaltungsräume zur individuellen Entfaltung und Gewinnung von Wohlergehen zu eröffnen. Wie weit die sozialtransformative Wirkung solcher Regime reichen könnte, bleibt hier offen und könnte Gegenstand weiterer Forschung sein. Darüber hinaus bleiben Commons und speziell Saatgutcommons ohne Zweifel Gegenstand des gesellschaftspolitischen Diskurses.

Mit dem Thema der vorliegenden Arbeit erfahren die Wahrnehmungsgeographischen Studien eine unübersehbare Weiterung. Angefangen bei den frühen Studien der Oldenburger Wahrnehmungsgeographie zum Heimatbewusstsein in ländlichen und urbanen Räumen über die Rezeption und Praxis alternativer Konzepte eines „sanften Tourismus“ sowie moderner Geographien des Essens bis hin zu lebensweltlichen Routinen im suburbanen Raum spannt sich inzwischen ein weiter Bogen an Themen, die den Weg in unsere Reihe gefunden haben. Wir danken Nina Gmeiner für ihr Interesse an den Wahrnehmungsgeographischen Studien, die sie mit ihrer gleichermaßen fundierten wie engagierten Studie um eine weitere Facette bereichert hat. Möge ihre Veröffentlichung eine breite und interessierte Rezeption erfahren!

Die vorliegende Arbeit wurde an der Fakultät II – Informatik, Wirtschafts- und Rechtswissenschaften der Carl von Ossietzky Universität Oldenburg im November 2022 als Dissertation angenommen und im April 2023 von der Verfasserin erfolgreich verteidigt. Für die Veröffentlichung in dieser Reihe wurde die Dissertationsschrift leicht überarbeitet. Nina Gmeiner ist heute als Wissenschaftliche Mitarbeiterin mit der Funktion einer Koordinatorin für das Projekt Klimagarten im Botanischen Garten der Stadt Oldenburg tätig.

Für die Herausgeber der Wahrnehmungsgeographischen Studien:

Ingo Mose

Oldenburg, im Juli 2023

## Preface

I have written this thesis during my employment and enrolment as a PhD candidate at the Carl von Ossietzky University of Oldenburg. Foundational knowledge on seed commons, the problem framing and research direction of my thesis, were developed in the context of the transdisciplinary research project “Right Seeds? – Commons-Based Rights on Seeds and Seed Varieties for a Social-Ecological Transformation of Plant Cultivation” (*RightSeeds*; grant no. 01UU1602A), that is funded by the German Federal Ministry for Education and Research (BMBF) as part of the program “Research for Sustainable Development” (FONA). It started in October 2016 and finished in July 2022. *RightSeeds* researchers worked closely together with the research project “Development of organically bred fruit varieties in commons-based initiatives” (EGON), that was funded by the German Ministry of Science and Culture of Lower Saxony from 01/2017–07/2020. This dissertation is a research output of the project *RightSeeds*. All empirical data was collected and analysed both for this thesis and as part of *RightSeeds* and discussed with colleagues and project partners. Some findings included in this thesis have in parts already been published in journal papers, conference proceedings or anthologies:

- Gmeiner, N., Kliem, L., Ficiciyan, A., Sievers-Glotzbach, S., & Tschersich, J. (2018). Gemeingüterbasierte Rechte an Saatgut und Sorten als Treiber für eine sozial-ökologische Transformation des Pflanzenbaus. In *Treffpunkt Biologische Vielfalt XVI – Interdisziplinärer Forschungsaustausch im Rahmen des Übereinkommens über die biologische Vielfalt*.
- Gmeiner, N., Sievers-Glotzbach, S., & Becker, C. (2020). New Values for New Challenges: The Emergence of Progressive Commons as a Property Regime for the 21st Century. *Ethics, Policy & Environment*, 1–21. <https://doi.org/10.1080/21550085.2020.1848194>
- Sievers-Glotzbach, S., Tschersich, J., Gmeiner, N., Kliem, L., & Ficiciyan, A. (2020). Diverse Seeds – Shared Practices: Conceptualizing Seed Commons. *International Journal of the Commons*, 14(1), 418–438. <https://doi.org/10.5334/ijc.1043>

- Sievers-Glotzbach, S., Gmeiner, N., Tschersich, J., Marscheider, N., Ficiciyan, A., & Kliem, L. (2020). Wenn Saatgut zum Gemeingut wird. *Ökologisches Wirtschaften – Fachzeitschrift*, 33(1), 16. <https://doi.org/10.14512/OEW350116>
- Sievers-Glotzbach, S., Euler, J., Frison, C., Gmeiner, N., Kliem, L., Mazé, A., & Tschersich, J. (2021). Beyond the material: Knowledge aspects in seed commoning. *Agriculture and Human Values*, 38(2), 509–524. <https://doi.org/10.1007/s10460-020-10167-w>
- Rohe, S.; Oltmer, M.; Wolter, H.; Gmeiner, N.; Tschersich, J. (2022). *Forever niche – Why do organic vegetable varieties not diffuse?* In: CIRCLE Papers in Innovation Studies, No 2022/08. <http://dx.doi.org/10.13140/RG.2.2.19325.03049>
- Gmeiner, N., & Sievers-Glotzbach, D. (forthcoming). Commons. In N. Wallenhorst & C. Wulf (Hrsg.), *Handbook of the Anthropocene*. Springer.
- Tschersich, J., Sievers-Glotzbach, S., Gmeiner, N., & Kliem, L. (forthcoming). The transformative potential of Seed Commons: Applying the social-ecological transformation framework to agri-food systems.

Research insights were presented and discussed at several conferences throughout the research process:

- *Interdisziplinäre Nachwuchswissenschaftlertagung zum Übereinkommen über die biologische Vielfalt*; 21.–25.08.2017, Vilm, Germany; Organizer: BfN (German Ministry for Nature Conservation).
- *Conceptualizing the New Commons: the examples of Knowledge Commons & Seed and Variety Commons* (Workshop); 06.–08.06.2018, Oldenburg, Germany; Organizer: RightSeeds research group.
- *6<sup>th</sup> International Conference on Sustainable Development* (ICSD); 12.–13.09.2018, Rome, Italy.
- *Klausurwoche Bioökonomie und moderne Biotechnologien: Ethische, rechtliche und soziale Aspekte*, Bundesministerium für Bildung und Forschung; 23.–27.09.2019, Universität Bonn.
- *Die Frage nach dem Eigentum* (Symposium); 6.–7.09.2019, Universität Oldenburg. Organizer: N. Gmeiner, N. Angebauer, 3GO (Graduate School).

## Glossary

**Affluent setting/conditions of affluence** – social actors are relatively financially and socially stable in comparison with other social groups within their country and in relation to other countries.

**Agrobiodiversity** – “The variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries.” FAO (2018a)

**Baya Nihan** – Filipino form of community work.

**Breeders’ privilege or plant breeders rights (PBRs)** – “allow the use of others’ proprietary germplasm when breeding new varieties” (Moschini & Yerokhin, 2007), meaning that breeders have access to all given varieties to use them as parent material for novel breeds, even if they were bred by another breeder.

**Capability** – opportunity for action.

**Capability Approach** – measuring individual well-being by assessing how many opportunities for action a person can achieve in various areas of their lives.

**Collective action problems** – situations in which actions with the highest individual benefit ultimately diminish positive outcomes for the collective.

**Commoners** – peers who manage a commons.

**Commoning** – the practice of (re)producing (social) relations.

**Commons** – communities democratically managing resources as an alternative to resource governance by market or state.

**Conservation breeding** – is breeding undertaken, not to create a new variety, but to preserve the traits of an existing variety against environmental pressures. As all plant populations naturally evolve over time, it is necessary to apply conservation breeding to keep a variety true to its description.

**Ex-situ conservation** – cold-storage of seeds or genetic information.



**Farmers' privilege** – “the practice of farmers sowing crops with saved seed”. (P. W. B. Phillips, 2007)

**Functioning** – actions people decide to realise; translations of capabilities into “beings and doings”. (Sen, 1992)

**Genetic engineering** – a blanket term for all procedures, which genetically alter plants in a way that would not naturally be possible.

**Informal seed sector** – the “total of seed production activities of farmers, mostly small-scale farmers”. (Almekinders, 2000)

**In-situ conservation** – conservation of seeds through continuous replanting in the field.

**Knowledge commons** – refer to the “institutionalized community governance of the sharing and, in some cases, creation of information, science, knowledge, data and other types of intellectual and cultural resources”. (Frischmann et al., 2014, p. 3).

**MaxQDA** – computer program for qualitative research.

**Open-pollinating varieties (OPVs)** – this means that the reproductive organs of the plants are intact, and they can be stably reproduced by farmers and farmer-breeders.

**Plant breeding** – means to alter a plant population according to pre-determined breeding goals (such as higher yield or a certain pest resistance). It starts with simple selection anyone can perform in their home garden and ends with high-tech genetic alteration.

**Regimes** – social constructs, more precisely interplays of social, material, and regulative systems, that can only be understood from the social perspective.

**Scarcity setting/conditions of scarcity** – social actors are relatively financially and socially unstable in comparison with other social groups within their country and in relation to other countries.

**Seed commoners** – the people who actively engage in the creation and maintenance of seed commons.

**Seed commons** – community structures in which seeds and their information are shared and maintained by farmer-breeders.

**Seed multiplication** – the practice of planting selected quality seeds in order to harvest and re-use the seeds.

**Seed saving** – the practice of keeping seeds from one’s harvest to replant them in the next growing season. Saving seeds is cheaper than buying new ones every season. Farmers may however prefer to buy seeds regularly to ensure stable quality.

**Seed sharing** – giving (saved) seeds to other farmers within or beyond the community. This can be small quantities for trial or helping out with a full amount sufficient for planting a field.

**Seed sovereignty** – questions of self-determination regarding seeds.

**Well-being** – how well a person is judged to be, by objective and subjective criteria.



# 1 Introduction

In an age where everything can be bought, many commodities also have a version organised outside of the markets: commercial encyclopaedias vs. Wikipedia, licensed stock photos vs. pictures registered under a CC licence<sup>1</sup>, supermarkets vs. buyer cooperatives, novel electronic gadgets vs. repair cafés, the list goes on and on. A particular case, and my research focus, are seed commons. They are living alternatives to industrial agricultural seed systems, in which seeds and varieties are the private property of companies. Groups of people, who you will get to know under the term *seed commoners* later in this thesis, are willing to spend substantial amounts of their otherwise free time, to self-organise variety breeding and seed production, although they could easily buy seeds from companies. The question is: Why? And one possible answer is: perhaps they feel better off that way.

Individual well-being has several facets, as chapter 2.1 *On Well-Being*, explains in detail: physical and mental health, knowledge, work, play and social relations are named as aspects commonly included in theories of well-being (Robeyns, 2003). All of them can be connected to property: which goods and services are accessible to humans, influences their health; how exclusively they are managed, contributes to the knowledge individuals may gain, and shapes their work lives and leisure time. Lastly, from a sociological and legal standpoint, property is not the thing or service itself, but the specific rules about relations between people (if and how I may use or influence your goods as well; for example, the neighbour's apple tree which hangs its fruit over the garden fence). Hence, property also influences social relations. The hypothesis of this thesis therefore is, that property regimes have an influence on people's life realities and individual well-being.

How exactly property and well-being link, is not well researched. Happiness, life satisfaction, well-being – scientists use various terms when trying to find out what people need to be happy and satisfied with their lives. Although a great body of research exists on the topic from various disciplines, ranging from psychology to economics, some findings seem contradictory and details

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1 CC stands for Creative Commons.

are still rather obscure, particularly on a micro-level of personal choices. For well-being and private property, the work of Easterlin (1974), later refined by Clark et al. (2008) and Deaton and Kahneman (2010), is still the most advanced. It says that with income rises, happiness only increases logarithmically (every quadrupling of income doubles happiness) and is mediated by comparisons to the income of those around oneself. Societally, private property is deemed to enhance individual freedom, individual security and societal welfare, by philosophers since Locke (1690)<sup>2</sup>. Yet, which regulations and logics of property influence the well-being of its owners and users, and how, is not researched. One reason is that ‘property’ is mostly understood as meaning private property in literature, and other forms of managing ownership are neglected.

In recent years, however, another property regime has attracted the attention of academics: common property regimes, or in short, commons. Ever since Ostrom (1990) published her seminal work in the book *Governing the commons*, scholars have found examples of shared ownership in most areas of human life (Benkler, 1998; Bollier & Helfrich, 2015; Bresnihan, 2015; Euler, 2018; Frischmann et al., 2014; Helfrich, 2009a; Hess, 2008; Ruivenkamp & Hilton, 2017). Common property regimes are living alternatives to private property regimes, answering two major global challenges of recent decades: commodification and social-ecological unsustainability.

One of the most criticised phenomenon of modernity is the increasing commodification of goods and services. It is identified as a general tendency of capitalism by political economists (Ciscel & Heath, 2001), sociologists (Dörre et al., 2009) and anthropologists (Gudeman, 2001). Goods, services, and other human interactions, which have formerly been offered for free, shared or exchanged, are turned into buyable and sellable commodities. Commodification stems from ‘more-is-better’ and ‘everything-has-a-price’ logics of human-resource relations, which broaden into human-human and human-nature relations. They become problematic when individuals are excluded from basic goods and services, because they cannot afford their prices; examples are education, healthcare, food, and seeds.

At the same time, ecological sustainability challenges amplify on a global scale, (IPBES, 2019; IPCC, 2014; Pacheco et al., 2021) as more and more planetary boundary thresholds are surpassed (Rockström et al., 2015). This entails a warming of the global climate, loss of biodiversity, an increase of extreme

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2 A more detailed philosophical-historical review can be found in Gmeiner et al. (2020).

weather events and the upset of ecological cycles, such as the water and nitrogen cycles. Social sustainability challenges follow on their heels, as less affluent countries are under a larger threat from these impacts (Huq et al., 2004; Sovacool et al., 2012). Farming as a primary source of income for farmers worldwide becomes more challenging (Gitz & Meybeck, 2016; Schmidhuber & Tubiello, 2007), and inequalities increase (Islam & Winkel, 2017; Marchiori & Schumacher, 2011).

Commons answer these challenges in bottom-up approaches, as communities of affected and interested peers, group together to maintain certain resources or facilitate necessary services. This ranges from community living (Tummers & MacGregor, 2019), to online-services (Frischmann et al., 2014), microfinancing groups (Mohindra & Haddad, 2005), and seed commons (Sievers-Glotzbach et al., 2020). Oftentimes, the same goods or services could be accessed via the market economy or public services. Why then do commoners (the people managing commons) bother to invest their time and capacities into creating alternatives? One reason is economic advantage, such as access to goods and services, cheaper prices, or sharing financial risks. My hypothesis, however, is that commons provide commoners with a complex and multifaceted set of desirable benefits, which include, not only economic benefits, but also social and moral values.

In short, I surmise that commons influence the well-being of people involved with them on economic, social, personal, and moral levels. Commons research touches on some well-being aspects connected to this specific property regime: commons are understood as a security net in cases where private property rights are insecure (Di Gregorio et al., 2008), they provide communities with identity (Hohepa et al., 2010), enhance mindfulness (Mcintyre, 2010) and foster self-expression (Bauwens, 2008). Not all claims are sufficiently backed by empirical studies. This thesis contributes to filling this research gap by asking in what way commons influence the individual well-being of commoners.

An example where this becomes especially visible are seed commons. Seed commons are community structures in which seeds and their information are shared and maintained by farmer-breeders. What makes them a promising research object is that first, opposing property logics are taken to the extreme in seeds. Private property seed companies enclose seeds legally and biologically to gain full control over their market potential. Seed commoners, on the other hand, are able to share seeds freely and often even without charge, as the natural multiplication of seeds produces more seeds than most farmers need individually. Private property logics of profit, exclusivity, and control, blatantly stand against common property logics of abundance, responsibility and

sharing. Second, seed commons are a global phenomenon with distinct and adapted forms of group structure and resource management. Comparing two case studies, one in the affluent<sup>3</sup> setting of farmer-breeders in Germany and one for Filipino small-scale farmer-breeders routinely faced with scarcity, allows for a good overview, with a hint of generalisation, and distinction of seed commons, despite the small sample size. Third, seeds matter. They are central and defining goods for farmer-breeders, without which they cannot pursue their jobs. Fourth, seeds have clear links to other economic, organisational, ecological and social aspects of farming and breeding, which means that they influence the complete socio-economic environments farmer-breeders live in. This facilitates the application of a broad theory of well-being.

The well-being theory chosen for this work is Sen's capability approach (1980a). It considers the multiple abilities people can achieve during their lifetime. In chapter 3.2, *The Capability Approach for Seed Commons*, I apply it to seed commons, in order to assess which abilities farmer-breeders gain, and which are inhibited, by working with seeds in this specific property regime. My hypothesis is that common seed property regimes have an influence on farmer-breeders' life realities and hence, well-being.

The research question of this thesis is:

In what way do seed commons influence farmer-breeders' individual well-being, visible in the capabilities they enable or inhibit?

1. How can the capability approach be applied to seed commons?
  - What normative basis is needed to support the CA in this research? (see Robeyns 2003a)
  - Which capabilities should be measured and how are they identified? (see Robeyns 2003a)
2. How are those capabilities met by seed commons in circumstances of affluence (Kultursaat e. V.) and scarcity (MASIPAG)?
3. What does that imply for goods and their ownership modes in general?

The outline of my work is the following: I start by reviewing which well-being theories we can choose from and why this thesis works with the capability approach (chapter 2.1 *On Well-Being*). Next, I talk about the subject that helps

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3 Rosling et al. (2018) argue that the Brandt line of dividing global societies into the 'Global North' and 'Global South' is outdated, as intra-national inequalities matter more for people's life realities in a modern, globalised society, than inter-national ones do. They suggest finding fitting terms to reflect those realities, for example classifying conditions of affluence and scarcity for certain groups of actors – both within their country and in relation to other societies. I will follow their suggestion in this thesis.

focus this research, a certain type of property regime: commons (chapter 2.2 *An Overview of Commons Theory*). I place an emphasis on explaining how commons are distinct from private property in their institutions and logics. The last part of the theory focuses on one resource managed as commons globally - seeds (chapter 2.3 *Of Seeds and Humans*). I will reveal everything you need to know about them, to understand how they interact with their surroundings, and hence influence the well-being of farmers and breeders. Chapter 3.1 *Seed Commons*, introduces the research topic in more detail, before chapter 3.2 *The Capability Approach for Seed Commons* brings all of this together to build an operationalised theory of the connection between the well-being of farmer-breeders with seed commons, to be applied empirically.

This brings us to methodology. The empirical research is comprised of two case studies, which are introduced in chapter 4.3 *Case Studies: The German Breeder Association Kultursaat e. V. and the Philippine Farmer-Breeder Network MASIPAG*. One of them is set in conditions of affluence and one in circumstances of scarcity, which gives the opportunity to compare seed commons in both cases. Before talking about them, I explain my empirical transdisciplinary research design with qualitative interviews, followed by a recursive theory building on their analysis (Chapters 4.1 *Transdisciplinary Research Design* and 4.2 *Research Methods, Data Collection and Analysis*).

Chapter 5 *Findings* and chapter 6 *Discussion of the Findings*, sum up and interpret my empirical work. The interview results are discussed in the light of commons and well-being, how they add to or contradict current knowledge on the subjects, their interrelation, as well as similarities and differences of seed commons under circumstances of affluence and scarcity. What could that mean for practice and further research? This is what we will have a conclusory look at in chapter 7 *Conclusion and Outlook*.





## 2 Theoretical Foundations

The main objective of this thesis is to understand how the individual well-being of farmer-breeders is influenced by seed commons. This chapter lays the theoretical groundwork in accordance with this objective and looks into the main theoretical strands relevant to this thesis: well-being, commons, and seeds.

It starts by reviewing and deciding on a theory of individual well-being (chapter 2.1 *On Well-Being*). The second part conceptually introduces commons as property regimes (chapter 2.2 *An Overview of Commons Theory*), which is necessary to understand the setting and management of seed commons as the focal points of this thesis. The last sub-chapter explains relevant biological, legal, and economic facts on seeds and varieties (chapter 2.3 *Of Seeds and Humans*), which are useful to follow farmer-breeders' opinions and ideas in the interviews later on.

At first glance, a big chunk of this theoretical framework might seem counter-intuitive for an economic analysis. However, this quote by Max-Neef (1986) acts as a double sneak peek to both my general view on modern sustainability economics and the topic of well-being in particular:

“This effort is not grounded in any particular field of study, as the new reality and the new challenges inevitably compel us to adopt transdisciplinary approaches. Evidence for this orientation is provided by the fact that we are rarely analyzing a specific problem but instead a web of complex issues that cannot be resolved through the application of conventional policies founded upon reductionist disciplines.” (p. 15)

The sustainability challenges of today's societies are not only ecological, social, or economic, but rather a mix of all three of them. That is why, to address them, the perspective of one discipline alone is usually too narrow. Even in an interdisciplinary approach, relevant epistemologies from praxis are missing. Theoretical foundations and data for this work are therefore developed in a transdisciplinary process (more on that in chapter 4.1 *Transdisciplinary Research Design*). For the following elaborations this means that knowledge about well-being, commons, and seeds comes not only from economics, but from a range of social sciences.

## 2.1 On Well-Being

Well-being has always been a topic of the social sciences and it is gaining importance for economics as well. Today, economics (and its appendices; commodification, efficiency, and competition) has seeped so extensively through most aspects of society, that well-being cannot be pursued outside of it, but has to be integrated in it. For seed commons, this means understanding which aspects of their socio-economic organisation promote or hinder the well-being of the people who develop and manage them. To do so, theories of well-being must be reviewed to see if they are useful in answering this question for seed commons. It encompasses being open to other disciplines and taking a critical stance towards the limits of one's own. For this reason, parts of my theory come from sociology, anthropology, and psychology, as this chapter will show.

### What does being well mean?

Although we all have intuitive understandings of what well-being is, the conceptual finesses and pitfalls merit a closer look. To explain understandings – and misunderstandings – of well-being, let us regress to a story known to most: Cinderella.

We have a young, healthy woman with a greatly developed character for her age, who chooses to take her skills, chances (and magic), to solve her life challenges, find her prince and go on to live with him in his parents' castle. Hence, she gains social ties and affluence for a life without (material) worry. In this snapshot of her life, where the fairy tale ends, she attains everything a person could desire. She achieves high levels of well-being and enjoys an outright blissful state of existence.

It would be a misunderstanding, though, to think a person could only be well in the moments of their life where everything falls into place. Is Cinderella completely deprived of well-being before her magical princess makeover? The fairy tale certainly wants us to believe so, by depicting the miseries of her life: the mother dead, the father gone, the stepmother and stepsisters beasts, locked in a life with little agency and personal choice. But the story also tells about her assets: a clever mind, basic formal education as well as practical skills, appealing physical features, youthful health, a roof over her head, a flock of birds as loyal friends and companions in need and, obviously, charm and solid dance moves. Her well-being is surely higher in the end, but it was not non-existent before.

This shows that it is hard to tell when someone is definitely un-well. Only in extreme circumstances, where a person has few assets to start with, no formal

education, poor health, and so on and then loses everything they have – land, home, family, job and community – be it by severe climate events or war, could they be judged miserable, with any certainty.

There is a lot of conceptual space between Cinderella’s happily-ever-after, and utter misfortune and failure. This illustrates the continuous spectrum of well-being.

Since the start of well-being research, a confusing array of constructs from various disciplines have been developed to describe this most basic striving of humanity. Well-being has a research tradition stretching over 2,000 years, starting with the Greek philosopher Aristotle and his eudaimonic virtue ethics<sup>4</sup>. Philosophers have not lost interest in the matter since (Nussbaum, 1988; Rawls, 1971), and nor have economists (Bentham, 1789; Layard, 2010; Max-Neef et al., 1986; Mill, 1879; Sen, 1980a), nor psychologists (Boehm & Lyubomirsky, 2009; Kasser, 2006; Ryan & Deci, 2000). The different disciplines complement each other in their outlooks on well-being. While philosophy applies a generally objective and universal view (What do people need to be happy?), economics largely focuses on societies and subjective assessments. Economics defines individual well-being as optimal satisfaction of one’s preferences, calculated as a maximisation of one’s utility function (objective approach), whereby preferences are a matter of individual choice (subjective aspect). Subjectivity is shared with psychology, a discipline that looks at individuals. *Figure 1* illustrates this general allocation. It seems that, over time, as many terms and related concepts have developed around well-being as there are scholars: happiness, subjective well-being, objective well-being, psychological well-being, flourishing, quality of life, life satisfaction, to name just a few. Most of them are somewhat distinct but also overlapping.<sup>5</sup> Researchers describe the same concepts under novel names, and sometimes one name is used for several concepts.<sup>6</sup>

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4 Which he explicates in his Nicomachean ethics (Aristotle, 1925).

5 Satisfaction and happiness, for example, being two distinct concepts of well-being, are taken together in psychology to form subjective well-being: “[S]atisfaction is a judgmental, long-term assessment of one’s life, whereas happiness is a reflection of pleasant and unpleasant affects in one’s immediate experience. The threefold structure of [subjective well-being as] life satisfaction, positive affect, and negative affect has been repeatedly confirmed in numerous studies.” (Lucas et al., 1996; in Keyes et al., 2002, p. 1008).

6 Sacco et al. (2006) introduce the concept of *individual well-being*, which intuitively sounds close to subjective well-being. However, they construct it as a needs-theory, where well-being depends on satisfaction of both material and relational needs, because individuals allocate their finite time resources between private and relational goods. Similarly, Ryan and Deci (2000) use the term well-being in an individualistic context. However, their loose definition assumes people to be well if they are functioning as positively as possible in the innate

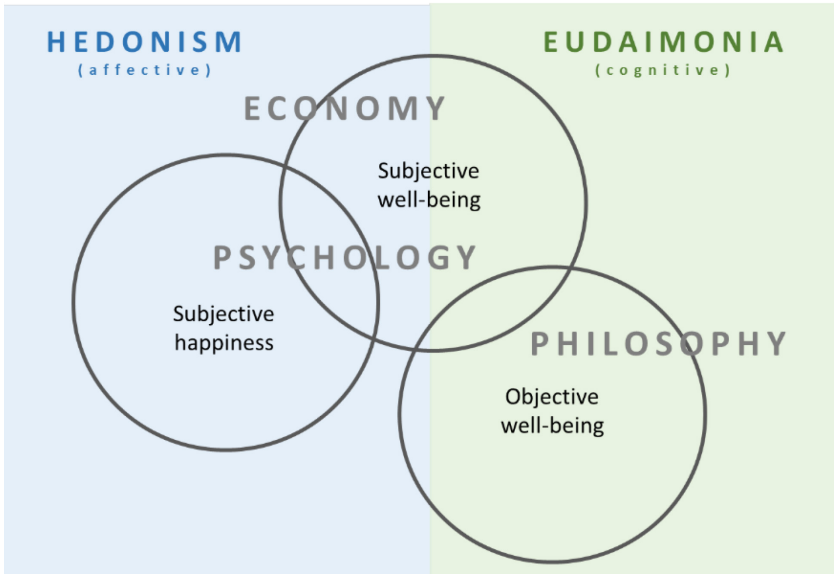


Figure 1: Generalised overview of research endeavours on well-being in different disciplines. Source: Own depiction

A well-known, but relatively closed construct within well-being research is *happiness*. It is not applied in this thesis, as it is short-term. This paragraph describes its general concept, to help with the demarcation of happiness and well-being further on. Happiness, as typically defined in psychology, is a “temporary, short-term affective state; fluctuates significantly over time and might change from day to day” (Bartels & Boomsma, 2009). This means that happiness principally describes the emotional reactions of a person towards the events they are affected by – viewing a burnt cake as a disaster or a great opportunity for a healthier snack instead, are two possible responses towards the same event which produce different outcomes for that person’s happiness. Research in psychology shows that about half of the variation in individual

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human needs of competence, autonomy and relatedness to fulfill their human potential. Their idea of well-being is hence closer to what is called *psychological well-being*, which refers to “formulations of human development and [...] full growth [...] of the individual” (Keyes et al., 2002, p. 1008). It is still not the same, however, as, according to Ryff (1989), psychological well-being describes six different dimensions: self-acceptance, positive relations with others, environmental mastery (to shape their environment so as to meet personal needs and desires), autonomy, purpose in life and personal growth.

states of happiness is determined by a genetic set point (Boehm & Lyubomirsky, 2009). Most of the residual variation consists of the person's choice as to how they react to life events (thus, per definition, being happy) and can be learned to some extent (*ibid.*). The construct of happiness is specific enough to be consistently defined in well-being research.<sup>7</sup> For the purpose of this research, however, happiness is too unidimensional (as it only describes affect), subjective and short-termed.

Simply deciding to use the opposite of happiness as a well-being concept does not work. While happiness studies converge towards a unified definition, the remainder of well-being research, depicted as subjective and objective well-being in Figure 1, is still as unsorted as Cinderella's peas and lentils. However, they encompass more long-term and stable variations of well-being,<sup>8</sup> which is what we are looking for.

Well-being as a concept is long-term, multidimensional<sup>9</sup>, dynamic and can be subjective or objective. Finding a coherent definition proves to be an ongoing challenge, perhaps because of its ancient tradition as a field of research. In the broadest, ethical-philosophical sense, "well-being" is taken generally to mean what is good for a person overall" (Ransome, 2010). While this basic claim seems to be straightforward enough, a plethora of outlooks on well-being has emerged, each focusing on a different aspect.

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7 In psychological research, happiness is a well-defined construct. However a source of confusion is that the word happiness is used in its colloquial meaning in non-psychological publications (Brown & Kasser, 2005; Clark & Oswald, 1996; cited in Sacco et al., 2006; Layard, 2003; Tomer, 2011). It is then used as a synonym for other constructs of well-being, such as life satisfaction.

8 Happiness and well-being are distinct, but correlate. In a study undertaken by Keyes, Shmotkin and Ryff (2002), Subjective Well-being (with two of three measures representing happiness), representing the hedonic research tradition, and Psychological Well-being (mainly measures of self-fulfillment), representing the eudaimonic tradition, are compared by Confirmatory Factor Analyses using a Maximum Likelihood Estimation. The concepts show high correlations, between .70 and .84 (in different modellings). Earlier explorative studies also indicate that well-being consists of two, moderately correlated general components, one that describes happiness or subjective well-being (rather hedonic) and another, eudaimonic one, that can be described as meaningfulness or personal growth (Compton et al., 1996; King & Napa, 1998; McGregor & Little, 1998; Waterman, 1993).

Striving for happiness and meaningfulness can complement each other in practice, for example in training a youth football team, which can be both fun at that moment (happiness) and give a person meaning. There are, however, instances where the hedonic and eudaimonic versions of well-being diverge. Caring for an elderly family member, for example, might be a burden for that time (decrease happiness), but at the same time are in accordance with one's values (give meaning).

9 See the discussion on well-being dimensions later in this chapter.

To structure my decision making on a suitable well-being concept for this thesis, I condense four general criteria, spanning philosophical tradition, scope, measurement and preference assumption: (1) hedonic vs. eudaimonic philosophical assumptions (sometimes described as affective vs. cognitive; Huppert & So, 2011; Keyes et al., 2002), (2) subjective vs. objective measurement of well-being dimensions (Veenhoven, 2008), (3) scope of individual or society (ibid.) and (4) static vs. flexible assumption of individual preferences (Huppert & So, 2011; Max-Neef et al., 1986).

1. The distinction between **hedonic and eudaimonic** approaches towards well-being dates back to the works of Aristippos of Kyrene and Epikur (hedonic) on the one hand, and Aristotle (eudaimonic) on the other. Hedonic well-being is understood as “the presence of positive affect and the absence of negative affect” (Deci & Ryan, 2008, p. 1), measuring well-being from subjective emotional response. That is why the idea of well-being through need fulfilment also dates back to this tradition. Aristotle, on the other hand, believes that *eudaimonia* (the final state of happiness) is reached by “a conscious and lifelong active exercise of intellect and character virtues” (Archontaki et al., 2013, p. 221). The idea of virtues is replaced by “living life in a full and deeply satisfying way” (self-fulfillment in a wider sense; Deci & Ryan, 2008, p. 1) in contemporary studies of well-being. For this approach, it is necessary to define the criteria for a life lived well.
2. Well-being can be measured (and developed) either from **subjective inquiries or objective reasoning**. Both approaches have their advantages and shortcomings: objective reasoning might produce more desirable outcomes morally (Nussbaum, 1988), as consequences of individual actions and aspirations on society and environment can be taken into account. A problem of objective well-being concepts, however, is their legitimation. It makes a difference for public acceptance, if a professional argues for a specific understanding of well-being, or if a broader range of people get a chance of “being heard and being involved” (Robeyns, 2003, p. 69). The other option of developing a well-being concept is asking subjects about their needs and ideas on well-being (subjective inquiry). This is perceived as more democratic and intuitively legitimate. However, complications with this approach may arise from the psychological phenomena of self-censorship and adaptive preferences (Begon, 2015; Khader, 2011; Nussbaum, 2001). These describe the phenomena where deprived persons may have a psychological advantage in everyday life, if they comply to certain facts in

their life realities or cultures and moderate their needs and wishes accordingly. People who have been socialised in a repressed environment tend to normalize their life reality and will not report a well-being dimension as being desirable to them although they are clearly deprived of it. For example, women in hunger-prone families are often systematically granted less food than the men in the household and suffer from measurable under-nutrition, yet they usually report that they are fine and receive sufficient food (Nussbaum, 1988).

3. Depending on the scope of the inquiry, well-being can either be **conceptualised for individuals or society**. Individual concepts of well-being account for inter-individual differences, might have psychological components and are usually subjective. They are a pragmatic account of *how things are*. Because of their individuality, it is generally not possible to formulate policy recommendations on a local or national level, from individual well-being concepts. Theories of societal well-being tend to be more objective. They either make moral assumptions on *how things should be* or consist of aggregate measures of individual well-being. In both cases it is hardly possible to take differences in an individual's understanding of well-being into account, which makes this outlook more prone to one-size-fits-all solutions. For effective policy advice, however, this approach is more feasible.
4. Finally, it has to be decided if **static or flexible ideas of well-being** are presumed, both between (Estes & Sirgy, 2017; Huppert & So, 2011; Max-Neef et al., 1986), and within individuals. For example, the respective well-being concepts would assume that one person values a high paying job, while another prefers work that is enjoyable, even if it pays less (interpersonal flexibility). Or, that a person might prefer the enjoyable job, but only until they are responsible for a family income, in which case their preference changes to the well-paid job (intrapersonal flexibility).

To answer my research question - how an organisation of seeds in common property regimes influences the well-being of farmer-breeders - the chosen well-being concept needs an eudaimonic view; must be suitable to apply both subjective and objective measurement; must focus on individuals; and will permit flexible ideas of well-being. The research investigates the long-term effect of seed commons on the possibility of farmer-breeders continuously accomplishing levels of well-being which meet their needs and values. An eudaimonic outlook is therefore more suitable than a hedonic one, because the latter is short-term. Subjective measures are used to find out how farmers and breeders perceive their ability to pursue their well-being through seeds. Objective



aspects, such as how it is currently (legally, institutionally, etc.) possible to use seeds and what should be normatively possible, are parts of the theory chapters. The focus needs to be on individuals, as farming and breeding needs are different for each context (for example, in contexts of affluence and scarcity) and even among the social actors in one community (for example, soil structure and altitude, financial assets, family situation, and so on). Similarly, flexible ideas of well-being need to be assumed for individuals, in case their situation changes (for example, novel farming needs through climate change) or their aspirations become different (for example, farmers decide to breed as well).

This raises the question of which well-being theories there are to choose from. I propose that well-being concepts can crudely be classified into three categories: objective distribution theories, dimension or list concepts, and processual concepts of well-being.

### **Objective distribution, processual and dimension theories of well-being**

#### *Objective distribution theories*

Objective distribution theories, such as Utilitarianism (Bentham, 1789; Mill, 1879) or the Theory of Justice (Rawls, 1971), propose rules for justly allocating all resources, services and rights which can be *good for a person*. They do not, however, specify what those goods would be. Rawls' Theory of Justice is only indirectly concerned with well-being (Austin, 2016). It proposes how 'primary goods', "a set of basic rights, liberties and opportunities" (ibid., p. 3) could initially be distributed equally in societies, assuming that this equality will enable well-being. It neither specifies, which rights, liberties and opportunities exactly are conducive to well-being, though, nor how to account for individually differing needs and how equality in societies is ensured after the initial societal set-up. It can thus be disregarded for this in-depth inquiry. The utilitarian tradition is classically rather hedonic (Tomer, 2011), and assumes fixed preferences. It takes a mainly quantitative outlook, where individuals want to maximise their preference function. It is moreover concerned with societal well-being rather than that of individuals. Therefore, it also does not include subjective inquiries or qualitative ideas as to what it is that makes people better off, only that there should be more of it. It is therefore also ill-suited for my inquiry. Taken all together, objective distribution theories of well-being are unsuitable for my research.

### *Processual theories of well-being*

Processual theories emphasise the nature of well-being as a transient state which can never be finally attained but needs to be understood as a continuous process. Dodge and her colleagues draft a processual definition of well-being from psychological findings (Dodge et al., 2012), drawing from a body of psychological-empirical works (Cummins, 2010; Headey & Wearing, 1989; Hendry & Kloep, 2002). “[S]table well-being is when individuals have the psychological, social and physical resources they need to meet a particular psychological, social and/or physical challenge.” (Dodge et al., 2012, p. 230). Figure 2 depicts the definition.



*Figure 2:* Definition of well-being by Dodge et al. 2012: 230

Well-being is understood as waves of challenge and (successful) resolution. It can never be finally reached. Each time a challenge arises, the see-saw tips, causing well-being to deplete slightly. If the individual possesses fitting and sufficient resources to resolve the challenge, the scales level again and their well-being returns to the original state. Similarly, and this is noteworthy, the scales tip if a person’s resources exceed their challenges (meaning the person’s life is without notable challenges), also causing well-being to decrease. This definition explains two aspects: first, the character of well-being is necessarily processual (not a state-to-be reached) and second, individuals have a need for constant and adequate challenge (and potential personal growth in the process).

This depiction of well-being has clear eudaimonic aspects in the idea of personal challenge for a flourishing life. It focuses on the individual, as can be seen in the distinct role psychological resources take in the depiction. That is why measurement is likely to be subjective. An assumption of flexible preferences is possible in the individual’s choice of preferred resources and challenges. While this understanding of well-being is suitable for application to the research on seed property regimes regarding all set criteria (eudaimonic, indi-

vidualistic, subjective & objective, flexible well-being assumption), its processual character is not an ideal fit for the research question. As this research is intended to be exploratory regarding which manifold impacts seeds have on farmers' lives, the well-being theory must be open to multiple aspects. While one could subsume them on the resource side of Dodge et al.'s theory depiction, they would still need to be drawn out in a list – something that is the speciality of the dimension theories of well-being, as we will see in a minute. That is why this processual view is largely set aside. Nevertheless, it gives a valuable general outlook on the (empirically tested) functioning of well-being as continuous; a state never to be reached. An organisation of goods in property regimes, as physical resources in this understanding, can be assessed on the continuous qualities of their availability and usability, which is an aspect worth considering for such malleable resources as seeds. In this research, the processual idea of well-being re-emerges, with thoughts on self-determination, well-being and seed commons in chapter 3.2 *The Capability Approach for Seed Commons*.

### *Dimension theories of well-being*

Dimension theories of well-being specify which of the different aspects are necessary to be well.<sup>10</sup> Well-being dimensions span multiple areas, as they try to exhaustively explain well-being.

Psychology applies an empirical approach to study human flourishing. That is why psychological studies often only pick one or a few well-being dimensions to examine in-depth. Research has been conducted on personal factors, social aspects, and culture.<sup>11</sup> Many of these dimensions can be found again in

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10 These endeavors cover quite a portion of well-being research, which leads Dodge and colleagues to critique that “Well-being is a growing area of research, yet the question of how it should be defined remains unanswered. [...] many attempts at expressing its nature have focused purely on *dimensions* of well-being, rather than on *definition*” (2012, p. 222).

11 Some dimensions of well-being that psychologists look into are: personality (Schmutte & Ryff, 1997; Sheldon et al., 1997), genetics (Archontaki et al., 2013; Boehm & Lyubomirsky, 2009), physical health (Ryan & Frederick, 1997; Ryff & Singer, 2000), meaning (King & Napa, 1998; McGregor & Little, 1998), emotional stability and adequacy of emotion (DeNeve & Cooper, 1998; Huppert & So, 2011; King & Penebaker, 1998; Reis et al., 2000), (hedonic) adaptation (Lyubomirsky et al., 2005), autonomy and self-efficacy (McGregor & Little, 1998; Ryan & Deci, 2000, 2001; Ryff, 1989; Sheldon & Elliot, 1999), goal fulfillment (Csikszentmihalyi & Csikszentmihalyi, 1995; Kasser & Ryan, 2001; Waterman, 1993), personal development (Compton et al., 1996; Ryff, 1989), motivation (Ryan & Deci, 2000), value systems (Bauer et al., 2012; Kasser, 2006; Kasser & Ryan, 1993), relationships (Carstensen, 1998), social ties and community (Bauer et al., 2012; Carstensen, 1998; Diener & Suh, 1997; Helliwell & Putnam, 2004; La Guardia et al., 2000; Nezlek, 2000; Ryff, 1989; Ryff & Singer, 2000; Simpson, 1990), material wealth and social class (Carver & Baird,

economic and philosophic list concepts of well-being. Besides research on single factors, both subjective and objective lists are drawn up in an attempt to grasp all relevant factors of well-being at once (e.g., Alkire & Black, 1997; Erikson, 1993; Grisez et al., 1987; Max-Neef et al., 1986; Nussbaum, 1995; Robeyns, 2003). The single dimensions featured in the lists vary, but across disciplines and application levels Robeyns (2003, p. 75) identifies them as usually containing a version of the following aspects:

1. life,
2. physical and mental health,
3. knowledge/education,
4. work,
5. play/leisure,
6. social relations (family/friendship/affiliation)

These concepts have roots in an eudaimonic understanding of well-being, as they essentially reference the various areas of thriving in a human life. As stated above, both subjective enquiries are possible within the dimensions, as well as their objective measurement (for example, education can be measured both by asking the subjects about their education in depth or reviewing the aggregate data on graduations in an area). It is possible to apply the dimension approach to individuals, to get a better understanding of their status of well-being or to make recommendations. Finally, within the dimensions a lot of conceptual space is left for an application with flexible preferences. The dimension theories hence, fulfil all necessary criteria as a suitable concept for this research. The only thing left to do is to choose one specific theory.

Amongst the dimension theories, three are especially recognised by social scientists. (1) Sen's capability approach. His is a general analytical framework adaptable to specific research inquiries. (2) Nussbaum's capability approach. She devises a predetermined list of philosophically reasoned capabilities. (3) Max-Neef's list of fundamental human needs and their adaptable satisfiers. Let's have a closer look at the three.

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1998; Kasser, 2006; Ryan & Deci, 2001; Schmuck et al., 2000) and interaction with the environment and culture (Archontaki et al., 2013; Christopher, 1999; Ryff, 1989). A compendium of these sources have been collected in a literature review by Ryan & Deci (2001). Some of these studies have become theories in their own right, e.g., Self Determination Theory by Ryan and Deci (2000), which explains the influence of motivation on well-being or Socioemotional Selectivity Theory by Carstensen (1998), which does the same for relationships.

## Capabilities versus fundamental needs – the decision for a theory

### *The capability approaches of Sen and Nussbaum*

The capability approach, in general, is a framework for understanding the well-being of individuals and communities by focusing on participant's opportunities for action. To determine a person's well-being, individual capabilities – opportunities for action – are evaluated. Capabilities can be simple, like having the ability to get sufficient nutrition or having access to safe housing, but also complex, e.g., the ability to engage in social life or the ability to pursue one's dreams (Sen, 1992). The freedom and number of real and valuable choices a person has, determines their well-being in this view.

This approach was developed from the 1980s on, first by the economist Amartya Sen (1980a, 1984, 1985, 1992, 1993) and later by philosopher Martha Nussbaum (1988, 2000, 2002, 2003). It is used to assess individual well-being and social arrangements, as well as to design policies. The capability approach is used in different disciplines (for example, sociology, political sciences and economics)<sup>12</sup> and its application is often interdisciplinary (Robeyns, 2003).

While their general ideas on capabilities and well-being converge, Sen and Nussbaum each work differently with the approach and subsequently two distinct strands of the approach have developed: an open-empirical approach (Sen), and a philosophically-concluded one (Nussbaum). Sen deliberately leaves his concept vague to ensure a wide scope of application. His loose framework is designed as a starting point for normative evaluation of individual well-being. Although he is repeatedly asked to draw up a coherent, universal list of capabilities relevant for well-being (Nussbaum, 1988, 2003; Qizilbash, 1998; Roemer, 1998), he refuses to do so. He argues that it would narrow down the possible applications of the framework, particularly because it would be fixed to a specific social choice theory (Sen, 1993; Robeyns, 2017).

Subsequently, other scholars take the task into their own hands, most famously so, the philosopher Martha Nussbaum (2003). She develops a universal list of

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12 The framework is used, for example, to look at poverty from a multidimensional perspective (Sen, 1985; Alkire, 2002), to assess the effects of political upheavals on the well-being of citizens (Ellmann, 1994) and to look at gender inequality in different contexts (Sen, 1985; Nussbaum, 2000; Robeyns, 2017). Besides these quantitative inquiries, qualitative research is also conducted with the help of this framework, for example to compile an "asset map" for actors within a case study (Jasek-Rysdahl, 2001). A prominent example of the capability approach informing practice is its implementation in the HDI (human development index; Fukuda-Parr & Kumar, 2003).

ten capabilities<sup>13</sup>, posed as a partial justice theory and a practical orientation tool for policy makers (Nussbaum, 2003; Robeyns, 2017). She argues that while she decides on relevant universal capabilities based on philosophical reasoning, she does not restrict the contexts. Each of her proposed capabilities remains broad enough to be interpreted for different cultures and is permanently open for revision by the scientific community. Noticeably, the two versions of the approach not only differ in the provision of a ready-made list, but have slightly different starting points and intentions to their work, and hence their areas of application vary. While Sen focuses on development studies, Nussbaum engages in ethical and political work.

### *The Fundamental Human Needs approach of Max-Neef*

The Chilean economist Max-Neef developed his theory of fundamental human needs in 1986. Starting from the basic hypothesis that “development is about people and not about objects” (Max-Neef et al., 1986, p. 16), he argues that people’s quality of life should be the measure of success or failure for development endeavours. Quality of life is determined by the meeting of an individual’s needs. Contrary to popular economic conviction at the time, Max-Neef conceptualises needs as finite and set, meaning that they do not change for one person over time and do not differ between cultures. That is why he calls them fundamental human needs. What varies and changes is how people individually, culturally, and historically choose to satisfy those needs. In his words: which ‘satisfiers’ they use.

The fundamental needs are built up of two categories which Max-Neef organises in a matrix<sup>14</sup>. The horizontal axis encompasses four existential categories: being, having, doing, and interacting. The vertical axis holds nine axiological categories: subsistence, protection, affection, understanding, participation, idleness, creation, identity, and freedom. A need is the combination of an existential and an axiological category. For example, one need is affection and having, where a satisfier could be having friends. Another need is affection and doing, with satisfiers such as sharing emotions or hugging one’s dad. People’s quality of life (which in this case can be read as a synonym for well-being) is higher when more needs are met with the satisfiers of their choice.

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13 Nussbaum’s (2006) ten capabilities are: (1) life, (2) bodily health, (3) bodily integrity, (4) senses, imagination and thought, (5) emotions, (6) practical reason, (7) affiliation, (8) other species, (9) play and (10) control over one’s environment.

14 You can find his matrix in *Appendix B: Matrix of Fundamental Human Needs*.

*The decision for Sen's approach as an apt dimension theory of well-being for this thesis*

Although I introduce well-being approaches by Sen, Nussbaum and Max-Neef. For this work I apply Sen's capability approach and model his framework to seeds. I decide to apply his approach for the following reasons:

First, the research is exploratory, as the question of farmer-breeders' well-being in regard to the common property regime of their seeds has not been researched yet. Sen designs his capability approach to be malleable to specific applications. Robeyns (2017) suggests that Sen's capability approach is a framework to assess the well-being of individuals, regarding their assets and social structures.

The strength of Nussbaum's exhaustive list is in its fixedness, which allows for comparability of situations and makes it useful for political demands, but less so for initial empirical exploration. It is necessary to first take a closer look into the complex intertwining of seeds and varieties, actors, and their societal, social, and ecological surroundings. The opportunity to do so with a theory suitable for this subject, and the ability to focus on details and systemic connections, exceeds the benefits of using a pre-selected list. In Max-Neef's theory, the fundamental needs are fixed, but satisfiers are adaptable, allowing enough room to adapt the model to a topic in an exploratory fashion.

Second, I apply the well-being theory to a specific group of people on the fixed subject of seeds. I follow Sen's argument that relevant capabilities are context sensitive. A universal list might therefore fail to capture the particular challenges of the field. Max-Neef designs his list for the general well-being of communities, not single resources. Altering or cutting out any of the needs is not designated by Max-Neef, hence the model is only adaptable in its satisfiers. The well-being theory for my empirical research needs to be adapted to the research object of seed commons. If I do so only on a satisfier level, some needs would have no specific relevance for seeds and would be left blank in farmer-breeders' interview answers. This would not be useful, but possible. Nussbaum leaves her list intentionally broad and argues that it can then be adapted to more specific contexts (Nussbaum, 2000). To reasonably use it for the narrow case of seeds as instrumental goods (which represents only a fraction of the factors for actor's capabilities), it would need a thorough reformulation. As her list is argued philosophically, a specification for seeds also needs sound philosophical reasoning. From my scientific background, that is not something I can claim to be capable of doing. Sen's approach is therefore the most applicable, as it is designed to be malleable. Following Sen, Robeyns (2003)

suggests the development of a topic-specified capability list from existing lists. By including both Nussbaum's list and Max-Neef's axiological categories as lists to draw from, their thoughts on relevant dimensions still inform my work.

Thirdly, the framing and underlying ethos of the project within the confines of which this thesis is developed, has a transdisciplinary research approach. Working in a transdisciplinary setting means to go beyond the subject-object perspective of classical research and include participants in the scientific process (Jahn, 2008; Lang et al., 2012), for example to jointly formulate research goals or discuss definitions of core concepts (more on the transdisciplinary approach in chapter 4.1 *Transdisciplinary Research Design*). That translates into a firm belief in the agency of the participating breeders and farmers, and in the value of their practical knowledge. Ideally, the well-being framework I use can therefore be adapted through joint discussion. To miss out on the chance to derive the capability list in a democratic process would therefore mean to miss a chance to hold true to the project's primary research principles. Especially for the seed context, this is important, as seed sovereignty (questions of self-determination regarding seeds<sup>15</sup>) has been a heated topic of discussion for past decades. One of the central demands of farmer-breeders, is that all persons concerned should be heard in a democratic process when political decisions about seeds and varieties are made (Shiva et al., 2013). As science forms one aspect of the system of production of information, which is the basis for the formation of public perception and political choices, how research is conducted matters. Including different participants in the creation of a capability list for seeds and varieties ensures that different (normative) views on the topic are integrated. For the reasons stated above, Nussbaum's theory is ill-suited. While Max-Neef's theory is adaptable in its details, its structure (the fundamental needs themselves), are fixed. The well-being framework needs to have room for structural adaptation as well. Sen's approach is therefore the most suitable, as no analytical categories are fixed.

Lastly, the capability approach is well defended and has a longer research tradition than the fundamental human needs methodology. One aspect of that is that researchers have become more creative with it than they have with the fundamental human needs approach. Examples exist where the capability approach is applied to specific topics or resources, such as Robeyns' work on gender inequality (2003) or Kleine's work on digital technologies (2013). I can

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15 Seed sovereignty is a protest movement, indignant at the enclosure of the vital goods of seeds and varieties through biological and regulatory means. It prominently claims seed sovereignty as an aspect of the food sovereignty peasant-movement (see Kloppenburg, 2014). More on that in chapter 2.3 *Of Seeds and Humans*.



take these as general models to adapt the capability approach to seeds. A more thorough introduction to Sen's capability approach and its application to seed commons follows in chapter 3.2 *The Capability Approach for Seed Commons*.

If well-being consists of different capabilities humans can choose to achieve, what forms and influences these capabilities? The hypothesis in the introduction states that property regimes might be an influencing factor, as they are necessarily part of everyday life realities every time someone uses a resource, good, or service. From our coffee in the morning to the leash we walk our dogs with at night – property regimes accompany our every move. This next sub-chapter explores if and how property regimes and well-being link.

### **Property and well-being**

The connection of property and well-being has been examined by philosophers and economists over time, with first notions in Greek philosophy (see Aristotle, 1905) and more extensive discourse from Locke (1690). Psychological-economic studies of the past decades (Dunn et al., 2011; Easterlin, 1974; Kahneman & Deaton, 2010; Kasser & Ryan, 1993; Layard, 2003) have re-kindled the discourse with insights contradicting foundational property theory (Macpherson, 1978).

In popular notion, owning more private property means more happiness (Fagundes, 2016).<sup>16</sup> It is believed to be a direct and linear connection. Besides contributing to happiness, property is believed to have personal value to people. Radin (1982) establishes that some types of property are defining to the identities of people, which is part of their well-being.<sup>17,18</sup> She suggests that for a just society, ownership of these goods should enjoy special political and legal protection and be made accessible to citizens on an equal basis. In general,

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16 This truism is so ingrained that Conklin (2015) writes a paper clarifying the misunderstanding that the “pursuit of happiness” in the US declaration of independence is not only a synonym for the right to property. It is meant as pursuit of virtue in an eudaimonic sense.

17 For the distinction of happiness and well-being, see the beginning of this chapter.

18 Her work sparks a substantial research interest in the topic of house ownership. Studies up to date agree that house ownership increases life satisfaction (Cheng et al., 2016; Hu & Ye, 2020; Zumbro, 2014) in several countries. Yet, circumstances of ownership influence the amount of life satisfaction gain in two respects. First, types of property rights matter. For a Chinese study, full ownership rights increase well-being more than partial ownership, where houses bought are subsidised by government or enterprises and not all rights are transferred (Cheng et al., 2016). Second, it gives more life satisfaction if the house is owned by one's spouse (as this likely coincides with a rise in social status) and the most, if it is owned jointly by a couple (Hu & Ye, 2020).

every installation and adjustment of property regimes has been argued to support human well-being in some form. Private property regimes foster certain values essential for functioning societies (Gmeiner et al., 2020) and are, in turn, accepted as central institutions by these societies. Classically, these values include individual freedom, security, and societal welfare.

That property is actually not a defining element of people's identities is a comparably recent finding (S. M. Stern, 2009). In fact, a lot of the theory about the link of private property and individual well-being is questioned on different fronts. Nussbaum (2000) disregards it altogether and reasons that goods have only instrumental value. While that might be generally true, there are some more nuanced findings. A well-known one in this regard, is the Easterlin paradox (Easterlin, 1974). It describes a cut-off point, where the data curve of income (which loosely translates to property through spending), and positive well-being stops having a linear correlation and instead flattens. More income creates more well-being only up to a certain threshold. After that, other factors of well-being, such as social ties, increase in relative importance. Another contradiction, is the gap between the belief of individuals in how much happier certain increases in income or property would make them, and actual empirical data. Several studies show that wealth and possessions matter much less for people's happiness and well-being than they think (Aknin et al., 2009; Nakazato et al., 2011; Schwarz & Xu, 2011). Two psychological reasons (Lyubomirsky, 2014) are hedonic adaptation (that people get used to new circumstances fast and adapt their excitement about them), and that perceptions of economic well-being are contextual to people's surrounding<sup>19</sup> – if you have a brand new Volvo, but all your neighbours drive Porsches, you are likely to feel less happy about your possession than if your peers were to be reliant on public transport.

Owning property can even have detrimental effects on well-being. Kasser (2006) describes that buying things (especially if to increase status), arouses a cloud of materialistic values, which tend to make one unhappy. A special case of ownership unhappiness is going into debt with one's spending. Owing money decreases well-being more than spending money on desired possessions increases it (Dunn & Norton, 2013).

Whether acquiring property makes you happy or not, depends on how you spend it (Dunn et al., 2011; Dunn & Norton, 2013; Fagundes, 2016). There are some ground rules for owning things in a way which increases well-being.

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19 More reasons are explained above in this chapter.

Spending intention determines if acquiring property makes the individual happier or less so (Fagundes, 2016). This hints back to Nussbaum's idea that goods are only instrumental: what increases well-being are social ties, memorable experiences, the pursuit of meaningful personal goals, and so on. Property can *facilitate* the practices and experiences which increase subjective well-being (ibid.). Do you want the car for status (likely not to increase well-being) or to be able to visit friends and family (likely to increase well-being)? In the author's own words: "The consensus of studies shows that property tends to reduce subjective well-being largely where owners expect the fact of acquisition in and of itself to generate happiness" (Fagundes, 2016, p. 69).

Research on the influence of property on well-being on a societal level is also concerned with institutional security. Clear property rights and their legal protection positively influence life satisfaction (Berggren & Bjørnskov, 2020; Graafland & Compen, 2012; Nikolaev, 2015). A particular finding is that clear and protected property rights decrease poverty (Norton, 1998). Their importance for people is illustrated by the finding by Nejad and Young (2016) that "[i]mprovements in legal systems and property rights appear to be the strongest pull factor for potential migrants." (p. 71). It might not necessarily be private property rights though, which are important to people. A study shows increases in life satisfaction for farmers in Ghana upon entering into contract farming (which curtails the classical notion of freedom, understood as a defining feature of private property). Yet, life satisfaction also increases for farmers if they are not contracted but instead, their property rights are ensured (Väth & Gobien, 2014). Which property rights are preferable could then be a matter of availability and context.

A recent line of property studies sometimes subsumed under the term *progressive property* disregards the institutional details of property rights and investigates the social functions they can facilitate. Property has the ability to foster social ties (Peñalver, 2005; Rose, 1986) which, as this chapter on well-being shows, impacts well-being positively. Possible uses of property to connect to others in a way that makes people happy, are to share it, donate it, or give it away to a personally meaningful cause (Fagundes, 2017).

One explorative study is noteworthy for its clear application of land ownership to the capability approach (Rao, 2018). It qualitatively answers the question of which common capabilities landowners report to achieve through their property. They include financial speculation, self-identity, financial security, and relationship building, amongst others.<sup>20</sup>

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20 Findings stem from a small sample of 15 participants from 11 countries.

What are the takeaways from this research? First, property matters for the well-being of people. Property institutions partly influence how societies organise and invest (Bennett et al., 2016), determining how groups and individuals behave. “[T]hey fundamentally influence how society invests in human capital, physical capital, and technology, as well as how production is organised” (ibid., p. 3). It shapes how people are trained and behave professionally (human capital) and what they do in their jobs (organisation of production). In the capability approach (the theory I decide for in forthcoming chapters, to form an understanding of well-being), what we can do and how we (perceive we) can behave, influences well-being. Now, if property influences behaviour, as we have seen in this chapter, and behaviour influences well-being (that is what the capability approach says), it is worthwhile to look deeper into the effect that property institutions have on the well-being of people who use them. Well-being through property then depends on the possibilities for action people can achieve through their property institutions. This could be the ability to work for personal wealth, the ability to (economically) plan ahead, the ability to have fair economic interactions with others, the ability to shape one’s surroundings with one’s work, and so on. Property institutions will foster well-being if the abilities they give people align with what these people need and aspire to. This hypothesis is underlined by the migration case introduced above: people leave their homes because they believe they will be better off elsewhere. If they systematically choose places with more desirable property institutions, they believe that they will fare better.

Most of the research is concerned with existing property institutions and looks at how social actors can best use them to improve their well-being. What about rethinking property institutions so they are more likely to foster well-being per se? Two aspects come to mind. First, non-material factors are a clear focus in terms of well-being enhancement. Recent findings have consistently shown that ownership does not increase well-being in itself, it only does so if it is used to support social and personal functions (such as connecting meaningfully to others). One goal should be to find such means of connection, or identify their lack, in property institutions. Second, property is, without saying, understood as private property in the research discussed above. However, there are property institutions which exhibit stronger non-material characteristics per se: commons. My research therefore looks at the non-material aspects of commons as property institutions and how they influence well-being.

For this to happen, the next chapter goes into detail on commons, a specific property regime which is central to this work.

## 2.2 An Overview of Commons Theory

Humanity has always faced problems of scarce resources: when one thing that is desired by many is not available in the quantity or quality needed. To determine who can use what in which way and when, all groups and societies develop some form of property regime<sup>21</sup>.

One form of property regime are commons: communities democratically managing resources as an alternative to resource governance by market or state.

To understand commons as institutions, their social, material and regulative aspects are analysed (Helfrich & Stein, 2011). Social and deliberative processes are more prominent for commons than other property institutions. While private property regimes are configured aptly and in detail in law, social arrangements in commons need to be negotiated in every aspect, by the groups that constitute them. I choose this rather clumsy phrasing to avoid a misunderstanding: commons do not describe resources. They describe the social protocols in place to manage those resources. Necessarily then, one needs to look at all three aforementioned aspects, in order to adequately describe a commons arrangement: the resource and its characteristics (material), the group of users (social), and the self-given rules (regulative).

Communities of commoners vary in size, homogeneity, resource interest, openness, and stability. It makes a difference to the deliberative process and its outcomes how communities are comprised. Is it twenty fishers who basically use the same technology who discuss their self-organisation? Or is it a hundred people, some of them local heritage fishers with a small fishing boat and others, foreign company owners with a fleet of trawlers?

Resources under commons management are equally varied: they can be material or immaterial, static or fluid, subtractable or not, have certain reproduction rates and so forth. Just as with community characteristics, sustainable management of a resource has different requirements depending on the specifics of the resource. On mountain meadows it is necessary to restrict the number of grazing animals and their reproduction; users are responsible for maintenance, such as maintaining avalanche fences. In this instance, small, well-connected groups are more favourable for effective management. With fewer rival resources, such as the information provided on Wikipedia, having loose and changing groups is less problematic. The online dictionary remains sustainable even

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21 Details on property regimes in general can be found in *Appendix B: Property Regimes – Background Theory*

when the majority of users choose to freeload and not pay their contributions before Christmas.

Depending on the characteristics of group (social) and resource (material), communities develop fitting institutions for the management, provision, (re-)production and use of the resource (regulative). Fishers might meet in the local café every noon after returning from sea and chat about the amount and location of migratory schools of fish over a cup of brew, incidentally renegotiating fishing quotas and access times for favourable spots. The founding community of Wikipedia, on the other hand, knows that there will never be spontaneous meetings with all contributors and users of the platform, so social protocols of conduct are explained to new members while they use and explore the dictionary. Renegotiation of these rules is done by only a fraction of the community.

This general approach to analysing commons along their social, material, and regulative characteristics is applicable to any institution. It is valuable as a first step to understand commons, regardless of the more specific research purpose.

Commons research splits into two of these more specific research purposes: a) analysing commons regarding the functioning and sustainability of the institutions they are governed by, or b) understanding processes of community building through joint commons management. These questions align with a duality of theoretical traditions: institutional economics for a) (commons as social-ecological property institutions), and sociological-anthropological approaches for b) (commons as community building) (Faysse & Mustapha, 2017).

The former follows the research tradition of Ostrom (1990), an economist and the first scholar to extensively work on commons from the 1960s on. She looks at commons with a resource focus: as social institutions to govern specific types of resources.

Sociological-anthropological approaches, on the other hand, focus on commons as building blocks of community. They examine processes of rule deliberation, and community creation, more intricately than institutional economists would and ultimately question how society would rearrange if commons were to become the dominant form of property institution.

Finally, a common ground has emerged: commoning. While its first ideas have developed in sociological-anthropological commons research, it is now also frequently taken up by economists, therefore bridging the gaps between both research approaches.

## Institutional economic commons research

Being an economist, Ostrom starts her research venture by looking at common pool resources as they are categorised in standard economics: rival resources with low excludability (Figure 3) (E. Ostrom, 2005).

		SUBTRACTABILITY	
		<i>Low</i>	<i>High</i>
EXCLUSION	<i>Difficult</i>	<b>Public Goods</b> Sunset Common Knowledge	<b>Common-Pool Resources</b> Irrigation Systems Libraries
	<i>Easy</i>	<b>Toll or Club Goods</b> Day-Care Centers Country Clubs	<b>Private Goods</b> Doughnuts Personal Computers

Source: Hess, C. and E. Ostrom, 2003, "Ideas, Artifacts, and Facilities: Information as a Common-Pool Resource."

Figure 3: Types of Goods. Source: Hess & Ostrom 2003

A resource is rival, if me using the resource (or a unit of it), precludes others from using the resource (or that unit of it). Food is an example of a rival resource: either I can eat this slice of walnut-banana bread, or you. Information, on the other hand, is not: we can both read the newspaper and get the same information. It is non-rival in its use. Of course, rivalry is a continuum rather than an on-off state. I do not have to eat the whole slice of cake, I could just as well share, giving both of us less than we want, but more than nothing. That is why Ostrom has opted to exchange the term rivalry for subtractability (V. Ostrom & Ostrom, 1977). Excludability of resources describes the possibility of a resource owner (or a group of resource owners) effectively preventing others from using the resource. I can store the cake in the pantry and lock it, so you cannot reach it. Cake is an excludable resource. However, it is difficult to exclude you from smelling cake when I bake it if you are my direct neighbour. Cake smell is a non-excludable resource. The natural common pool resources Ostrom focuses on are non-excludable and subtractable resources. Examples

are open-water fish stocks, village and mountain pastures, community forests, water resources and shared irrigation systems (they are referred to as the Big Five, as they still comprise the largest part of commons case studies up until present day; van Laerhoven et al., 2020).

Ostrom asks how groups manage common pool resources to solve collective action problems<sup>22</sup>. For this purpose, she and her team compiled several thousand case studies of long-term collective management of natural resources in local contexts. While classical economics regards resource sustainability a problem of efficient allocation of a scarce good, Ostrom and her team take social phenomena into account. They make their focus clear through terminology: what is abbreviated as commons today, they particularly call common property regimes. Regimes are social constructs, more precisely interplays of the social, material, and regulative, that can only be understood from the social. Their research focuses on the communities of appropriators and their deliberation processes, in which they devise their own property rules, rights and duties. Ostrom and her team can then understand key features of sustainable, collective resource management. They condense their findings into a list of eight *design principles for robust common property institutions* (E. Ostrom, 1990).<sup>23, 24</sup>

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22 Collective action problems are situations in which actions with the highest individual benefit ultimately diminish positive outcomes for the collective. Natural common pool resources are examples: on a mountain meadow, if every farmer increases their individual benefit by grazing ever more cows, the meadow's capacity will be overexploited, the meadow erodes, and no farmer can gain benefits from it in the future.

23 The design principles are: 1) Clearly defined boundaries, 2) Congruence between appropriation and provision rules and local conditions, 3) Collective-choice agreements, 4) Monitoring, 5) Graduated sanctions, 6) Conflict-resolution mechanisms, 7) Minimal recognition of rights to organise and 8) Nested enterprises.

They have since been audited and revised. For an overview see Cox et al. (2010).

24 They come up with two more tools which are still used and adapted as prime analytical instruments in the field today: the *institutional analysis and development framework* (IAD; E. Ostrom, 2005) for the analysis of collective choice situations and the *socio-ecological systems framework* (SES; E. Ostrom, 2009) which facilitates sustainability assessment of socio-ecological systems. The IAD is an instrument to analyse situations of collective decision making. It looks at decision making situations (action situations) and the involved actors, and takes exogenous variables (biophysical conditions, attributes of the community and existing rules) and the community's evaluative criteria into account. It then describes outcomes of the decision-making process and how those outcomes influence the exogenous variables for the next decision-making situation. The SES is a tool to analyse resource governance institutions as well. Here, the focus is not on decision-making processes within the community, but on the interactions of the common property system with surrounding ecosystems and social, political, and economic institutions. The SES is more formalised than the IAD and, depending on research focus, offers a multitude of variables on up to four tiers for assessment.



Natural common pool resources, such as fishing grounds, are not the only types of resources managed by groups. Hess, a librarian at Indiana State University where Ostrom conducted her research, realises similarities between what her colleague describes as commons and the way information is made accessible in libraries. Together with Ostrom, she conceptualises knowledge and information, which are non-natural and immaterial resources, as commons (Hess & Ostrom, 2003, 2007). Hess does not stop there in her search for unconventional (viewed from the knowledge base at the time) commons, and publishes her findings as examples of what she calls new commons (Hess, 2008).<sup>25</sup> She identifies commons institutions for knowledge and digital applications, in neighbourhoods and medicine, in the social and cultural sphere, for infrastructure and markets and on global scales.<sup>26</sup>

At least now, commons are clearly inherently social. As described above, Ostrom and her colleagues have already recognised that the property regimes around common pool resources need a focus on social aspects of their governance to be understood. It is this focus that is a novelty in economic research. What Hess does conceptually, is to relax the first premise of institutional economic commons research, which is to enter into it from a specific material base (a common pool resource). She establishes that it is the community governance which defines resources as commons, more than their material resource characteristics. Why? By including resources into commons studies which are not natural common pool resources, Hess severs the connection between commons and the predetermined goods categories of economics (Figure 3). Take the example of the online knowledge resource Wikipedia. Classically, it would be

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25 Throughout all years of commons research, a big five of research topics prevail: pastures, fisheries, forests, irrigation systems and water management (van Laerhoven et al., 2020). They are what is sometimes referred to as traditional commons. New topics gained importance in the past ten years of research, called new commons in line with Hess' article title. They focus on new technologies (e.g., knowledge, digital commons, and intellectual property rights), the environment (e.g., biodiversity, climate change and environmental governance), urban commons and political questions (e.g., gender, environmental justice and inequality). The dichotomy between traditional and new commons is not widely agreed upon (Euler, 2018; van Laerhoven et al., 2020). It is a broad chronological distinction of when topics gained importance in commons research rather than a conceptual divide. More important for empirical research are subcategories of commons, for which the classical frameworks have been adapted, e.g., Stern's extension of the design principles for global commons (P. C. Stern, 2011) or Frischmann, Madison and Strandburg's adaption of the IAD for knowledge commons (Frischmann et al., 2014).

26 Research on these specific commons can be found using the terms knowledge commons, global commons, neighbourhood commons, cultural commons and digital commons (non-exhaustive list).

categorised as a public good, because exclusion is difficult (as an ever-increasing number of people has access to the internet) and subtractability is low (I can read the same article as you). Its categorisation as a public good would generally inform economists that this resource would be most efficiently managed as public property by the state. Hess' work highlights cases where goods from this category are governed as commons. Her takeaway message is: successful management of resources does not depend on their material characteristics, but on the quality of the socially deliberated institutions which surround them. To understand property, one must understand its social basis.

Two specific types of commons subsumed under new commons are introduced in more detail, as they are partially relevant to understanding seeds as commons: knowledge commons and global commons.

Knowledge commons refer to the “institutionalized community governance of the sharing and, in some cases, creation of information, science, knowledge, data and other types of intellectual and cultural resources” (Frischmann et al., 2014, p. 3). Resources governed by this commons type (information, data, and so on) are typically immaterial and non-rival. Therefore, resource production is more relevant than resource allocation or governance. Because many knowledge commons work online, creation of fluid, decentralised groups of actors are likely. People organise knowledge commons less on the basis of locality and personal dependency (as is the case for traditional commons), and more due to individual interest and expertise.

Knowledge commons are not necessarily fixed to purely informational resources. Oftentimes these immaterial resources are (at least remotely) connected to a material carrier (Sievers-Glotzbach et al., 2020). In the case of online knowledge commons, for example, physical servers are needed to store the information and a device with internet connection is needed to access it. This feature makes aspects of knowledge commons relevant for other complex commons, amongst them seed commons, as further explained in chapter 3.1 *Seed Commons*.

Frischmann and his colleagues (2014) model Ostrom's grounded theory approach, to gain further insights into the specifics of knowledge commons by collecting and analysing large numbers of case studies. One (preliminary) result is an adaptation of the IAD framework to knowledge commons. Their conceptualisation emphasises the increased mutual dependency of variables, compared to the classical IAD (concerned with natural common pool resources). Because it is the community which produces the resource (instead of governing an existing resource stock), attributes of the community directly

influence resource characteristics and the rules used for the production and allocation of the resource. At the same time, every interaction and decision directly (re-)produces the variables it is guided by: community, existing rules and resources.

It becomes clearer with an example. In a fishery commons (think: traditional commons; natural common pool resources; original IAD), an allocation decision needs to be taken: How many grown mackerels need to be left alive to ensure reproduction, taking into account the novel environmental pressure of ocean acidification, which curtails natural reproduction rates? Here, the variables are independent: oceanic acidification is a biophysical characteristic the community cannot influence, as are mackerel reproduction rates. The outcome of the decision, say leaving twenty percent more adult fish in the sea, will have some effect on resource characteristics (here the characteristics of the mackerel stock), but it is difficult to determine which effect exactly. Intended outcomes must be evaluated by continued observation of actual change. For knowledge commons this is different. Take Wikipedia: the community can only add knowledge in fields where they have expertise. This links the resource characteristics (what kind of information) directly to the community it is created by. If a decision is taken, say to write an article about reproduction rates of mackerel, this decision equals a new resource characteristic. There is no additional feedback loop necessary (the function of observation in the last example). These specifics should be kept in mind whenever knowledge aspects play a role in commons.

While knowledge commons broaden our understanding of commons to immaterial resources, global commons do so for global resource systems without defined boundaries and with open user groups. The atmosphere, the deep sea and Antarctica have been studied as global commons (Joyner, 2001; Mudiwa, 2002; Soroos, 2001) as well as (agro-)biodiversity (Dedeurwaerdere, 2013; Halewood, 2013).

Global commons are conceptualised as a distinct type of commons, because their scope poses specific challenges (E. Ostrom, 1999). The large number of potential participants in a global commons comes with cultural heterogeneity, different interests and unequal power distribution, all factors which make deliberation of institutions more challenging. Global resource systems are complex and interlinked. An example is the interplay of biodiversity, climate and (independent) social processes on micro levels around the globe which all influence each other and have effects for the whole planet. This example makes an additional aspect clear: actions taken on one part of the planet might have detrimental effects in another; responsibility is abstract, because cause and

effect cannot be linked precisely, and the affected and causers do not know each other. Monitoring and sanctioning mechanisms, be they legal or social in nature, are therefore difficult to install.

Drawing conclusions from these facts, Ostrom (2010) suggests polycentric and heterogeneous institutions for the governance of global commons. They are a way for the world's population as a whole, to remain flexible and experiment a little with different institutional approaches. Trials for the whole system are difficult to conduct on a global level – experiments are risky, challenging to organise and examples of other governance possibilities on other planetary systems humans could learn from, have not yet been found.

To mitigate the precariousness of the governance of global commons, Stern (2011) up-scales Ostrom's design principles to apply them to global resource systems. For the reasons named above – low comparability, few cases to learn from and little room for experiments – these design principle modifications are conceptual and have little empirical backing. Principle 1 is aborted for global commons, because the boundaries of resource systems cannot be clearly defined on a global level. Principles 2 to 8 basically remain the same but are more complex to deliberate and apply. Monitoring (principle 4), for example, is difficult to establish because of conflicts of interest, the impossibility of an unbiased supervisor, and differing legal systems among states, to name but a few challenges. In response to the complexity and uncertainty of global commons, Stern adds four additional principles: (9) investment in science to understand complex interactions in global social-ecological systems, (10) integrating scientific findings through extensive deliberation in order to rationalize global commons' governance, (11) planning for iterative, institutional adaptation through repeated risk management and (12) keeping a multitude of parallel and heterogeneous institutions to cope with cultural diversity and facilitate pockets of experimentation.

Although there are few global commons which are in need of international management today<sup>27</sup>, these few have an impact on multiple smaller commons. Global oceanic ecosystems recursively influence local fishery commons for example. Likewise, biodiversity as a global commons links to smaller agricultural commons systems, such as seed commons.

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27 In the formulation “which are in need of management”, a conceptual shift becomes apparent. From commons as social organisation, as Hess describes them, the understanding shifts to a normative notion of resources which should belong to all in global commons.

With knowledge and global commons, two specific fields of institutional economic commons research have been introduced. The institutional economic viewpoint, however, is but one possible way of understanding commons. Commons are a vast field of study, and it is therefore not surprising that they are studied in a broad range of fields: economics and business, law, biology, social and political sciences, psychology, and computer sciences. However, economic and institutional perspectives are still prevalent today (van Laerhoven et al., 2020). What has changed in institutional-economic commons research is the scope. While case studies in local contexts are still a substantial part of publications, national and global applications of commons are on the rise (ibid.). They are especially valuable to further research on environmental issues. Additionally, there is another important set of questions, which economists are not well prepared to investigate: questions of how property institutions shape society, how power structures play out in them and what happens to communities in processes of deliberation. These aspects of collective action are studied by sociologists and anthropologists.

### **Sociological-anthropological commons research**

Sociological and anthropological scholars who work on commons would wholeheartedly agree with the statement that was an epiphany for economists: commons are social. They, however, have much more experience in the study of collective action<sup>28</sup> than the economist novices, who stumbled upon it rather recently and were slow to realise, what a treasure trove of existing literature they had ventured into. Sociologists exhibit a polar opposite approach to their research on collective action, to that taken by economists. While economists start from efficient resource use and allocation, sociologists and anthropologists wonder how groups work together collectively. The organisation of resources in commons institutions is part of that collective action research. Their interest is not on the resource or its sustainability (material), but on actors (social), the way they deliberate their institutions (process which leads to the regulative) and how these institutions in turn influence actors.

The sociological and anthropological study of commons is less predefined than institutional-economic endeavours. Essentially, there are no fixed frameworks. Scholars select social science theories to match their research interest and case study. This allows for in-depth analysis of independent cases, capturing their

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28 First works on commons from these perspectives date back to the 1960s (for example Olson, 1965).

specifics, however it exacerbates case comparison and the generalisation of findings.

What is it then, sociological and anthropological commons research look at in terms of topics, research questions and methods? One focus is on factors external to the commons regime in question, and their interactions with the commons. This includes factors such as: migration and poverty (Agrawal, 2001), the state (Mosse, 1997), technology (Forsberg, 2018; Van der Kooij et al., 2015), and the emergence of social movements (Villamayor-Tomas & García-López, 2018). Similarly, the influence of societal specifics on commons is taken into account in questions of power (García López et al., 2017; Velicu & García-López, 2018), gender (Mosse, 1997; Zwartveen & Meinzen-Dick, 2001), and religion (Meinzen-Dick et al., 2002). Finally, internal factors which influence groups of commons actors, are examined. These include human and more-than-human relations (Nightingale, 2011; Singh, 2017; Velicu & García-López, 2018), as well as the more economically phrased social capital (Meinzen-Dick et al., 2002), emotion (Nightingale, 2011; Singh, 2017), subjectivisation (Nightingale, 2011; Singh, 2017)<sup>29</sup>, leadership and authority (Meinzen-Dick et al., 2002), and communication (Lopez & Villamayor-Tomas, 2017).

More generally, sociological and anthropological commons scholars ask how variables are related and linked (Agrawal, 2001), under which conditions commons form in the first place (Mosse, 1997), and in which social history they develop (ibid.). Their research does not start from a defined resource category (such as natural common pool resources), but includes collective action more broadly, often tying in previous works of scholars in the field. This has two

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29 It is no coincidence that Nightingale, Singh and sometimes García López are frequently grouped within in the same bracket. They all apply feminist theory to commons. Sato and Soto Alarcón (2019) subdivide feminist commons research into four main strands: (1) ideas on post-capitalist community economies, e.g., Gibson-Graham (2013, 2016), (2) autonomist Marxist feminism, e.g., Federici, (2012), (3) ecofeminism, e.g., Shiva (2005), Mies & Bennholdt-Thomsen (2001) and (4) feminist political ecology, e.g., Nightingale (2011), Meinzen-Dick and Zwartveen (2001).

Feminist theory adds specific topics to commons research: gender, subjectivisation and natureculture/socionature (a bridging of the divide between humans and nature). Power, necessarily, is another focus (but it is also found in sociological and anthropological commons studies in general). As commons are increasingly seen as promising building blocks of a new society (see commons ideology below) by activists and scholars alike, some claims of their sustainability and equity are repeated without substantive scientific evidence. Feminist scholars point this out, especially for ecological sustainability, gender equity and equitable access (Sato & Soto Alarcón, 2019; Tummers & MacGregor, 2019).

Several feminist theorists epistemologically prefer commoning (see below) to understand commons, as it is able to analyse intricate aspects of power relations and social change processes.

practical implications. First, some of the case studies presented would not be judged as commons at all by economists. Examples are studies of state-induced irrigation governance, where the state still has substantial rule-setting power (Meinzen-Dick et al., 2002; Mosse, 1997), thereby curtailing the classic autonomous self-governance sought after in institutional economic commons case studies. This differing understanding is bound to cause confusion as to which case or topic should be included in commons research, but at the same time it also helps to keep a broad horizon on possible hybrid arrangements (state-community and private enterprise-community governance), and understand the various ways collective action communities influence society. Second, by referencing to previous works in the specific field (for example, prior studies on irrigation systems in that region in India), micro-frameworks develop, which can precisely describe similar and regionally clustered case studies. To condense an overarching framework of collective action (as institutional economics has proposed for commons with the IAD and SES) is, however, neither viable nor a goal of this approach. In return, the detailed factors which develop for the specific applications can describe the case studies more adequately than broader institutional economic frameworks and include their specifics. Several suggestions for adjustments in institutional economic commons frameworks have been made by sociological scholars over the years, as we will see below. Both institutional-economic and sociological-anthropological approaches have their merit, even if the translation between them is not always without complications.

As in any case, when viewing societal deliberation, formation and change, power is a central influencing factor and sociological-anthropological commons studies acknowledge this. Scholars tackle questions such as: How do family and community power relations mediate the action of (female) commoners in collective farming endeavours (Nightingale, 2019; Sato & Soto Alarcón, 2019)? What influence do intra-community power differences have on use rights in the commons (Zwarteveen & Meinzen-Dick, 2001)? Are conventional social power structures necessarily challenged in commons, such as disproportional amounts of time spent doing care work between women and men (Tummers & MacGregor, 2019)? Acknowledging power in commons helps to understand the deliberation processes which form commons in detail. It also makes power relations and struggles visible and is hence able to explain actors' seemingly irrational choices (Nightingale, 2011).

Mosse (1997) argues for a bifocal view on actor's motives to engage in commons. Commoners not only strive for material capital when governing commons, but also symbolic capital (c. f. Bourdieu, 1977) – the various aspects of

civic life that cement social status.<sup>30</sup> In other words, a commoner might want larger shares of a fish stock (material capital), but every once in a while, it might be more rational for them to grant a share to an uncle, who might bestow them with one of his ocean-view landholdings, on which to build a home in the future (this is not a trade, but a building of social capital based on reciprocity), or to argue for the share to be given to an influential family to increase the chances of being elected into local politics. Taking symbolic capital into account can uncover implicit rules present in commons – the unwritten ones you are likely to trip over if you enter an existing commons.

Methods comprise analytical-calculative approaches, such as regression analysis (Meinzen-Dick et al., 2002) and comparative statistics (Agrawal, 2001), but also social theory, such as actor-network theory (Carlsson & Sandström, 2007; Steins, 2001), political ecology (Leder et al., 2019; Tummers & MacGregor, 2019), Gramscian post-Marxism, and strands of feminist theory (García López et al., 2017; Nightingale, 2011; Singh, 2017).

#### *Critique of social-anthropological scholars towards institutional economics commons research*

Both schools of thought have quite distinct understandings of commons. Bardhan and Ray (2006) point out the three conceptual key points in which institutional economic and sociological-anthropological commons concepts differ. First, institutional economists view actors as autonomous, while sociologists and anthropologists stress their embeddedness (socially, culturally, historically and ecologically). Second, institutional economists focus on outcomes, while sociologists and anthropologists look at processes. And third, institutional economists tend to cherish parsimonious theories (clear with only the most necessary variables), while sociologists and anthropologists embrace complexity.

It is no surprise that the different points of view economists and sociologists hold, provoke misunderstandings and criticism between them. Starting with Mosse (1997) and Steins and Edwards (1999), sociologists and anthropologists

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30 Mosse's own words are so apt on the matter that it is worth citing them: "I do not wish to suggest that common property resource use is other than the product of individual strategy and rational choice, but rather that there has been a failure to take cognizance of the fact that such strategizing is mediated by institutions (concepts, meanings, values) which are constituted in culturally and historically specific ways (Douglas, 1986). [...] material interests are often inseparable from social relationships, and [...] choices are mediated by shared assumptions about such things as justice, fairness and reciprocity." (Mosse, 1997, p. 472).



point out the shortcomings of institutional economic commons research (Faysse & Mustapha, 2017)<sup>31</sup> and make suggestions for improvement:

- Sociological and anthropological research identifies core aspects which should be included in studies of collective action. Power relations, wider social embeddedness of actors, history of the particular commons, actors' adaption of views and preferences through engagement in the commons, and discourses within the group of commoners, are inadequately considered in institutional economic commons theories and frameworks.
- Institutional economics tries to understand commons as social systems with only one purpose: resource management. Relationships between people in communities are more complex, and actors consider several issues when interacting. For example, which other contexts they know each other from; family ties or rivalries, local politics and so forth. They disregard social and symbolic capital.
- Similarly, actors have more complex motives when organising a commons and are not completely confined by economic rationality. Cultural value and identity might be further incentives for engagement; economic efficiency may not be the prime goal.

Some of the critique has found resonance in economics. For example, there are attempts to include power relations into the IAD (Clement, 2010) and the SES (Epstein et al., 2014). Most of it has, however, gone unheeded.

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31 Inversely, the anthropologist Acheson (2011) suggests to his colleagues to get better acquainted with Ostrom's work.

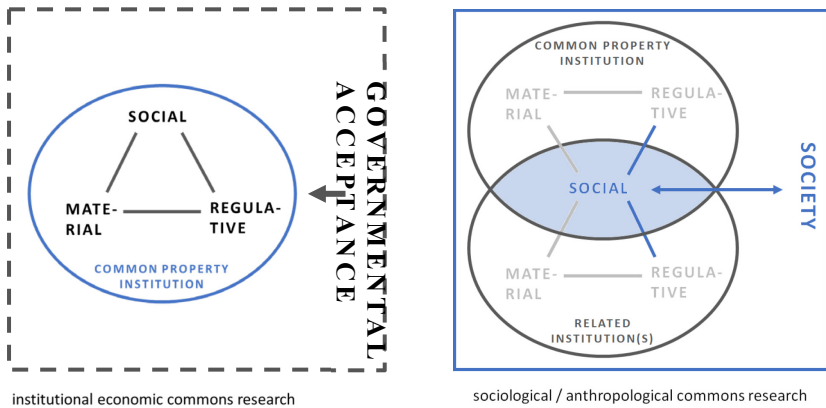


Figure 4: Research foci of institutional economic and sociological-anthropological commons studies. Source: Own depiction

Figure 4 indicates in blue the research foci of institutional economic (left) and sociological-anthropological commons studies (right). While institutional economics looks at one common property institution and its rules, social-anthropological commons research is interested in the relations amongst commoners or between commoners and non-human actors, the deliberation processes of institutions (less so in the deliberated rules), the intersection of different commons and the recursive influence of society on commons and vice versa.

To sum up, institutional economic commons research concentrates on governance regimes surrounding a resource. These regimes are described, analysed and, to some extent predicted, by their social, material, and regulative characteristics (Figure 4). Economists use a limited set of commons frameworks, which standardises research, alleviates structuration and comparison, and allows for generalisation of findings, as well as predictions of successful long-term resource management. On the other hand, it is less able to grasp more intricate aspects of social organisation. It has also been criticised as being ahistorical, prone to misinterpret actors' motives and somewhat static.

Sociological and anthropological perspectives start from the case study and select fitting theories for their analysis from a wide range of options. This leads to a detailed understanding of the case in question, as well as its interplay with overlapping institutions. It captures actors' life realities and pursuits fully and can describe the interplay of collective institutions and society. On the downside, general conclusions for the success of collective action cannot be validly drawn, due to the focus on social factors and processes of deliberation, which

largely disregards the institution's material and regulative aspects. In return, influences external to the commons institution and their interplay can be studied (Figure 4).

## Commoning

Although the walls are firm between the two disciplines, there is one theoretical approach to the study of commons where the lines blur<sup>32</sup>: Commoning. The term is introduced by the historian Linebaugh (2008), who argues that commons are social practices, hence actions, and are therefore more adequately captured through a verb than the misleading noun. Commoning is an approach that looks purely at the social relations in commons arrangements. Euler (2018) describes it as “voluntary and inclusively self-organized activities and mediation of peers who aim at satisfying needs”. Notably, the material and regulative aspects of institutions are non-existent in this conceptualisation. The social is distilled in this view of commons.

Scholars utilizing commoning as a lens to understand commons come from across all the social sciences: economics, sociology, anthropology, human geography, political ecology and others. Commoning authors tend to publish in interdisciplinary groups and journals (Bresnihan & Byrne, 2015; Gibson-Graham et al., 2016) and, judging from a Scopus search with the term *Commoning*, the field is rapidly gaining attention. Since first articles were published around 2010, five to ten appear in journals until 2015. From then to 2019 this number steadily rises to around 50 a year.<sup>33</sup>

Commoning shares key understandings with sociological-anthropological commons research, such as a process view, the embeddedness of commons into surrounding social-ecological systems and sensitivity to power relations.

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32 Bresnihan (2015) views commoning as a third option of understanding commons. He generally distinguishes between material/natural and immaterial/social commons. Commoning, for him, bridges the gap between this material-social divide. The difference in understanding of this chapter and his work is that he subsumes new commons under immaterial/social commons, while they have been grouped with institutional economic commons research (in line with the underlying research tradition) here, following Faysse and Mustapha (2017; institutional economic vs. sociological/anthropological commons research). Vivero-Pol (2019; resource-based vs. governance-based view) and Perilleux and Nyssens (2016; essentialist vs. praxis approach) make a similar distinction to Bresnihan, but with different wording and no explicit mention of commoning.

33 This also seems to cause some blur: in recent publications the term commoning is sometimes used without apparent application of the specific view towards commons described below (e.g., Danso-Wiredu, 2020; Middleton & Ito, 2020). Here, commoning is merely used semantically as the verb form of commons.

However, commoning solely focuses on (social) relations which are performed within commons, development of subjectivities and socio-ecological transformation. Hence, the commoning view raises new questions towards commons: How does the engagement with commons change the ways people relate? What effect does that have for the individual (building of subjectivity)? And what could that mean for society (transformation)?

Commoning is the practice of (re)producing (social) relations.<sup>34</sup> Let us dissect this understanding.

First, commoning as a practice means that commoning is always action: production and reproduction.<sup>35, 36</sup> In this definition of commoning, both commons and commons communities are co-constituting (Sato & Soto Alarcón, 2019), meaning they produce each other, therefore commons cease to exist as soon as they cease practice, and a person is only a commoner while engaging in joint commons governance. While you might remain a carpenter even after retirement, you are only a commoner while actively engaging in the (re)production of a commons. This understanding is radically different to (institutional economic) property notions of commons, where the commons (defined from their resource base) continue to exist as common pool resources i.e., something that could or should be managed as a commons.

Second, from the understanding of commoning as the (re)production of commons relations, a process view of commons is a logical consequence (Tummers & MacGregor, 2019). Being a process, commons are at no point a steady state which can be analysed and compared (as is done with the IAD or design principles) without missing essential features. Today, commoning relations may be configured this way – tomorrow they might have shifted, thereby (slightly)

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34 I merge this essential claim from Bollier and Helfrich (2015) on the one hand, who describe commoning as “relational social frameworks” and Bresnihan (2015), who sees it as a “continuous (re)production of the commons through shared practices”. I have decided to also make *social* optional here by putting it into brackets, because feminist commoning scholarship explores the bridging of the nature-human-divide through commoning, looking at human-human and human-non-human relationships alike (Nightingale, 2019; Tummers & MacGregor, 2019).

35 Also *use*, if Euler (2018) is followed, who talks of *(re)produsage*.

36 While a praxis approach is more flexible and fluid as an analytical approach towards commons than the institutional economic frameworks, some sociologists go even further and take a subjectivist position: “I argue for the need to focus on *doing* commoning, *becoming* in common, rather than seeking to cement property rights, relations of sharing and collective practices as the backbone of durable commoning efforts.” (Nightingale, 2019, p. 16).

changing the nature of the commons. This is not to say that commons are understood as unstable, but inherently flexible and ready to react to the permanent complexity and uncertainty they entail (Bresnihan, 2015).

Third, commoning manifests through the enactment of relations – not resource governance, not rules, not access (as a directed, unilateral action), not deliberating individuals. Commoning does not just understand relations as the most important aspect of commons, in this view, in fact, commons are nothing but “relations-in-the-making” (Nightingale, 2019, p. 18): between the commoners, between them and the resource and between them and their environment. Everything else, like the long-term success of the resource’s production and governance, or the agreed upon rules, are outcomes of deliberations of relationships within the commons.

Commoning is not necessarily seen as an alternative to market and state, but manifests a different onto-epistemology altogether (Bresnihan, 2015; Nightingale, 2019). Individuals engaging in commoning do not do this from a position of separation, where revenues are calculated, resources are instrumental and others are competitors. They view commoning as an unfolding reality, which they themselves are part of. They form entangled subjectivities<sup>37</sup> through various, partially unpredictable human-human and human-non-human relations.

Groups who engage in commoning together are unified by a shared set of meanings and values – even if these are tentative, initial or limited (De Angelis, 2017). When (re)productive action is required, those values can be called upon to motivate action.

The approach has a notable activist background and scope. Known intellectuals, who identify as activists, use the terminology: Esteva (2014), Stavrides (2015), Bollier and Helfrich (2015). For them, commoning is a “political tool and horizon” (Vivero-Pol et al., 2019, p. 8) with the power to politically mobilize communities (Dyer-Witheford, 2007; Hess, 2008). They do not stop at analysing existing examples of commoning, but rather ask how practices of relation-setting within commons communities can influence society. Ultimately, they want to assess if commons might be the cell form for a commons society (Euler, 2018), or commonism (Dyer-Witheford, 2007), just like Marx (1867) identified commodities as the cellular form of capitalism. This new society would unfold on logics of solidarity and sharing, instead of competition and growth (Hardt & Negri, 2011; McCarthy, 2005; Wall, 2017). Commons,

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37 Specific studies on how commoning forms subjectivities are undertaken by Singh (2017), as well as Velicu and García López (2018).

whose values of social-ecological sustainability, sovereignty and re-democratisation support societal change, and which have developed to protest existing or emerging enclosures, are described as *progressive commons* by Gmeiner et al. (2020).

To get from one societal logic to another, transformation is necessary. A vast number of recent studies reflect on commoning practices to fuel social-ecological transformation,<sup>38</sup> as they are “a critical corrective of predominant, neoliberal-economical rationality and practices” (von Winterfeld et al., 2012, p. 6).

Why exactly is commoning seen as promising for transformation? There are three main reasons for this: (1) they foster social imagination, (2) the values and logics found in commoning can be counter-hegemonic to those of current society, and (3) commoning can infiltrate conventional modes of governance. (1) In commoning, people jointly create “the environments they want to inhabit when the state and the market fail to deliver” (Tummers & MacGregor, 2019, p. 63). In other words, communities of commoners engage in social imagination (Castoriadis, 1998) to project alternative logics of living together, satisfy their needs and regain autonomy. They not only imagine these new realities, but in fact, perform them as “common liveable relations” (Velicu & García-López, 2018, p. 3), effectively creating living alternatives (Sato & Soto Alarcón, 2019; Tummers & MacGregor, 2019). (2) This becomes possible through new logics and values which commoning can support.

One part of this is the onto-epistemology described above. Politically, logics of commoning are described as counter-hegemonic (Vivero-Pol et al., 2019) to commodification and enclosure logics of current neoliberal economies. I intentionally write that commoning *can* support these values – commoning as an analytical concept only describes a process of relation-building. Whether these processes are socially desirable or not is another question.<sup>39</sup> (3) Commoning is not understood as an alternative form of property, but a process that can form even within traditional property institutions (this feature is called non-capital-ocentric by Sato & Soto Alarcón, 2019). It also enables hybrid modes of resource governance (van Laerhoven et al., 2020), where state, private owners

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38 Commoning as transformation: Tummers & MacGregor (2019), Singh (2017), García López et al. (2017), Varvarousis (2020), Esteva (2014) and Zapata Campos et al. (2020).

39 One can easily imagine racist commoning, for example. A group of likeminded white males voluntarily satisfying their need for what they perceive as cultural integrity through armed hindrance of immigration. The confusion of commoning as a neutral, analytical concept with its growing political depiction as a socio-ecologically sustainable panacea, even in scientific literature, is criticised by feminist scholars (as mentioned above; see for example Tummers & MacGregor, 2019).

and commons communities share responsibilities, for example in co-management or co-production.

Commoning is, hence, a radically different angle of understanding commons. Like a horse being assessed quite differently by a veterinarian (Is it healthy?) or a racecourse investor (How much money will it make?), different aspects of commons unfold analytically depending on which discipline looks at them.

### **Commons and well-being**

Commons research does not select well-being as a focus topic (an exception is Rao, 2018), but mentions it frequently, both conceptually (Bauwens, 2008) and in case studies (Kesanta & Andre, 2015; Kpanou et al., 2021; McIntyre, 2010; and others).

Institutional security is a concern of research on commons and well-being, just as it is a topic for private property and well-being research. Commons scholars come to similar conclusions. One case study shows that the well-being of fishers declines if commons management becomes more challenging or fails (Biswal et al., 2017). That means, when (common) property institutions become insecure. Along the same lines, commons are not always the type of property institution that is preferred by actors to increase their well-being, as fishers from Benin show (Kpanou et al., 2021). Preferences for property regimes are contextual and depend on the explicit institutions. Di Gregorio et al. (2008) look at well-being through commons institutions in contrast to the private property institutions which would be the actors' alternative. They do so with a focus on poverty, as they observe: "Property rights held by poor people are often insecure. Insecure rights have overall less value compared to secure rights, as the likelihood to capture future benefits streams is reduced" (p. 14). Their findings suggest that commons frequently emerge (or are fostered by the state or NGOs) for poverty reduction if private property institutions fail. "Oftentimes, use of common (or state controlled) resources provides a safety net in times of extreme need" (p. 18). In this case, commons are seen as a security before all well-being is lost, not as a contribution to well-being as such. Another general remark on property institutions and well-being is that insecure rights might lead to overexploitation of natural common pool resources, allowing the resource to degrade. This leads to future local well-being problems. In this way, social-ecological sustainability becomes visible as a part of well-being.

Several case studies explore the connection of commons and well-being for specific commons arrangements. Biswal et al.'s (2017) and Kpanou et al.'s

(2021) fishery cases are already introduced above. Other cases include the importance of cultural commons for identity and well-being in Maori culture (Hohepa et al., 2010), family well-being increases through financial commons for women in Tanzania (Kesanta & Andre, 2015), and explorations on how mindfulness, well-being and global commons are connected (Mcintyre, 2010). Each of their understandings of well-being are instrumental and conceptual discussions of which parts of the commons institution that lead to well-being changes, according to specific well-being theories, are not being undertaken.

Some caution is due with regard to the substance of commons and well-being claims (some critique of unsubstantiated commons claims is already mentioned above). Bauwens (2008), for example writes about the distinct logic of peer production processes, which radically differ from industrial production and draws universal and rather uncritical conclusions for well-being. An example:

“The individual can fully express himself and his capabilities. It is clear that such a process is very efficient to minimise frustrations due to the unequal distribution of power. There is no dependency to obtain resources, no mechanism needed to allocate scarce resources” (p. 242).

These flattering claims are not sufficiently backed by empirical and conceptual research. Several other commons texts exhibit similar tendencies (Helfrich, 2009b; Helfrich & Heinrich Böll Stiftung, 2014). These unilateral positive outlooks on commons are criticised from within the field (Sato & Soto Alarcón, 2019; Tummers & MacGregor, 2019).

The takeaways from this section, are that commons scholars have drawn connections to well-being theory, but mostly superficially. Positive claims about commons regarding well-being are omnipresent, but seldom sufficiently backed by conceptual and empirical research.

A research gap presents itself to explore how exactly, commons can contribute to well-being and why, as well as the limits to their contribution, and possible detrimental effects. This might also generate further insights into how structures of property institutions in general, influence well-being. First findings are generated with this thesis in the specific areas of commons institutions and the capability approach, as one theory of well-being. The case studies used to generate these findings are seed commons. The next chapter is an introduction to seeds and the biological, legal, and economic environments faced by their commoners: farmer-breeders.



### 2.3 Of Seeds and Humans

Seeds are an input factor for agriculture. Yet, contrary to other inputs like fertilizer, seeds have greater historical, cultural, and biological importance for humans.

Agriculture is still one of the main professions for people worldwide. An estimated 26.7% of the world population are farmers (about 2 billion people; FAO, 2018b)<sup>40</sup>, who work directly with seeds. But also, for the rest of the population, crop seeds are vital, as they are the foundation of human consumption. Farmed fruits and vegetables depend on them, but also modern animal husbandry. Cattle, pigs, and chicken are fed with human-grown feed (at least under circumstances of affluence), such as corn and soy. Seeds are thus directly or indirectly relevant for almost every individual on earth, be it as food producers or consumers.

**History.** Seeds have ancient importance for humans, as they share a long history (Banzhaf, 2016; Kloppenburg, 2004).<sup>41</sup> Over the past eleven thousand years, farmers have been shaping modern crops step by step. Today's varieties are distinctly different from their wild plant ancestors. Corn, for example, has been developed from the sweet grass teosinte, an unspectacular grass similar to those commonly found in uncultivated meadows. For the longest part of this history, farmers have doubled as breeders. Crops as we know them today and crop diversity, have been developed through observation and selection as part of regular farming practices in farmers' fields. What is described as modern breeding in the following, adds comparably incremental improvements to the farmer-developed diversity and innovation.

Breeding became professionalised around 1800 and gradually became institutionalised in public breeding institutions and universities. By 1900 it became common practice for farmers to buy seeds instead of saving and multiplying them on the farm. In the 1930s, variety licenses were introduced as a legal instrument, which required farmers to pay royalties on seed saving for the first time. At about the same time, private enterprises started breeding and multiplying seeds, gradually changing the seed market from public to private. The 1960s and 1970s are agronomically known as the Green Revolution. During

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40 These numbers are not unchallenged. Another paper estimates that there are 2.5 billion small-scale farmers alone, not yet counting industrial farmers (Holt-Giménez & Altieri, 2013). The general trend though, that agriculture is a common profession, holds.

41 I only point out milestones here, *Appendix C: The History of Seeds* gives a more thorough review, as well as the works of Kloppenburg (2004) and Banzhaf (2016), from where this information is primarily taken.

this period, the industrialised, high-input, fossil fuel dependent agriculture as we know it today was developed (Kirschenmann, 2007) and globally promoted.<sup>42</sup> This includes worldwide marketing of a few, highly efficient varieties. Farmers adopted the modern seeds and lost their traditional landraces, with the effect that 75-90% of genetic diversity in crops vanished from that time on (Barbieri & Bocchi, 2015; FAO, 2004; Pautasso et al., 2013). With inventions in plant genetic modification and the establishment of more restrictive intellectual property rights for varieties from 1976 on, it became desirable for agrochemical corporations to enter the seed market. They could now synchronize varieties to certain pesticides and sell them as an exclusive bundle. This proved a successful and competitive business model, leading to substantial market consolidation from the 1990s onwards. Famously today, there are only a handful of noteworthy global players on the seed market (Bonny, 2014; P. H. Howard, 2015).

**Biology.** Some of the importance of seeds for humans is due to their profound and fascinating biology. Seeds are a powerful innovation of life on earth. They are hardy and durable security shells and transportation devices for enough genetic information and nutrients to produce new life, even if it requires a bit of a wait or radical conditions. Some seeds can germinate after decades of dormancy, some survive (and need) fires, frost, or animal digestion to stir.

Seeds store genetic information, which determines the appearance and behaviour of the emerging plant. Some species are much more elaborate than humans on that account: while we feature each chromosome twice (biologists say our genes are *diploid*), sweet potatoes and wheat have six of each (*hexaploid*), providing them with a vast genetic base. Their genetic code reads like Tolstoy, while we are a mere Donald Duck comic.

I have talked about abundance of seeds and genes so far. There is one more aspect of plenitude: diversity within species. Through adaption to diverse environmental conditions and breeding, library-worthy amounts of related but distinct varieties of each food crop have been developed. A few thousand different varieties of potato, wheat, rice, and tomatoes exist around the globe.<sup>43</sup>

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42 Farming this way is energy inefficient. For every calorie produced in food, ten calories of fossil fuel are needed to power farming machinery and produce agrochemical inputs (Herren, 2011).

43 This diversity can be fragile. The wars in the Middle East over the last decades have coerced several central seed banks for arid crops, mainly grains, to relocate their collections. In times of war, however, the continued work of these storage facilities is threatened ("Seeds in Threatened Soil", 2005) and crop diversity may be lost.

**Culture.** Finally, there is cultural importance of seeds and crops for humans. It is somewhat connected to their shared history and biology. Crop plants and humans coevolve, which means neither would develop the way they did and do, without the other. That is one side of the coin, the other, necessarily, is mutual dependency. Plants developed as crops have been grown used to human care and would not survive without it. And humans, as mentioned above, need crops for consumption and survival. Bearing this in mind, it is only consequential that seeds are ingrained in human culture.

Around the world, seeds are part of spiritual practices and are symbols of fertility and life. This culture develops from people's dependency on crops. Depictions of those rites are found in documentaries and other popular scientific media (Betz & Siegel, 2016; Brush et al., 2000). While ritualistic seed worship is not common in most societies anymore, cultural practices and festivities around seeds and crops are still anchors of identity and pride. Historically important crops condense in regional customs, proverbs, and cuisine. Specific dishes exist for distinct, local varieties. Any proud cook from the small Bavarian town of Bamberg will insist that the real, Franconian potato salad strictly requires *Bamberger Hörnla*, a small, impractically bent potato with, as they would assure you, outstanding consistency and taste. Whole cities draw parts of their identity from important, regional crops. Oldenburg in northern Germany proudly advertises as the *capital of kale* and every winter hordes of liquored citizens make their way through town in small groups called kale tours to end at a restaurant serving a heavy dish of the cabbage family gem. In the end, humans' cultural link and excitement for crops and their diversity is embodied in every gardener who decides to plant their own food, while there is an abundance of it in the supermarket. The thrill of finding and trying a new variety seems universal, both in planting, cooking and eating, sparking creativity all along the food chain.<sup>44</sup>

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44 Nevertheless, the importance of seeds becomes less visible in modern culture. As subsistence farming has virtually no importance in affluent societies, seeds are frequently degraded to mere food. The bag of walnuts in your pantry could be planted into a hectare of walnut grove, the packets of rice or sorghum could easily be turned into fields of grain. At the same time, we have never consciously seen seeds of an array of plants we regularly consume. Think of salad, carrots, or potatoes. What we know is the young state of plants, because that is when vegetables are still sweet and tender. Everything else is omitted from the consumer-plant reality: their stirring from seeds, their transformative maturation, their flowers, and their decay after producing their own offspring. Not knowing the seeds of everyday plants is even odder, as it is naturally hard to avoid their abundance. One planted sunflower seed will multiply in the hundreds, amaranth in the thousands. 'Why is a bag of seeds from the supermarket so expensive then?' I hear you ask. I will get to that when describing commercial handling of seeds and the seed market.

The introduction already points towards current social-ecological sustainability challenges, such as market concentration, pressure from climate change and genetic erosion. These challenges also affect seed handling, as described later in this chapter. First, however, some more background knowledge is given on seeds in an agricultural sense, starting with official definitions of the terms *seed* and *variety*, some further terminology of seed actors and practices and an overview of a typical modern seed value chain. If you are familiar with this topic, feel free to skip ahead to the sub-chapter *Boundaries of seed practices in modern seed systems: three kinds of enclosures and sustainability challenges connected to them*, in which the three kinds of seed enclosures are described, as well as the related sustainability challenges.

## A crash course in seeds: Definitions, seed practices & the seed value chain

This sub-chapter dives into the essential background knowledge and terminology connected to modern and traditional seed systems.

### *Definitions of Seeds and Varieties*

The modern relationship between humans and seeds is intricate in its practical and technical aspects, as revealed in the basic question: What are seeds and varieties?

**Seeds:** The Dictionary of Biology (Freudig, 2006) defines seeds as “seed and fruits which serve as the reproductive organs of plant species”, meaning every part a plant produces to grow offspring.<sup>45</sup>

**Varieties:** Defining seeds is relatively straightforward, defining *variety* is not. This is because variety is used in different contexts and disciplines with varying motives. Politically, it is a determined concept, a “plant grouping within a single botanical taxon of the lowest known rank” (Art. 1 lit. vi UPOV, 1991). This means, all plants looking and behaving sufficiently alike, are identified as the same kind. The Dictionary of Biology (Freudig, 2006) goes into detail as to what that botanical taxon is, when defining varieties as “populations of cultivated plants which are distinguishable by morphology (looks), physiology (behaviour), cytology (cellular functions), biochemistry or other specifics from other plant populations of the same species”. For the use of varieties in agriculture, a temporal dimension is important, as “characteristics must persist after generative or vegetal propagation” (Kliem & Tschersich, 2017, p. 4). Summed up, varieties are stable<sup>46</sup> plant populations distinguishable from similar plant populations by various (biological) criteria. This definition sounds rather vague. Indeed, where exactly the lines are drawn between two varieties is the subject of continuing discussions in biology.<sup>47</sup> Plants feature genetic variability (to varying extents) to adapt to environmental conditions. The biological question of variety definition is how much variability is tolerated before it is warranted to describe a set of plants as another variety.

Legal studies take a firmer approach towards the term variety. Law is designed to regulate the availability and quality of plant produce necessary for human

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45 This is the biological definition of seeds. Seed law uses a narrower definition, which is presented later in this chapter when talking about jurisdiction.

46 They exhibit the same traits over several generations.

47 Especially since genetic marker analysis has become available as a novel, more precise screening method. It uncovers both unknown relationships between varieties, as well as genetic differences within them (e.g., Singh et al., 2016).

food and medicine production. In that function, it disregards less professional and imprecise varieties, such as landraces and farmer varieties. Legal criteria of variety registration prominently feature uniformity (see the DUS criteria later on). In this way, farmers are sure to purchase seeds, which exhibit the described traits, without too much deviation, linked to specific environmental conditions on the respective farm. Economically and politically, variety is a term laden with financial and power interests. How it is understood determines which law applies (and vice versa), and shapes markets, financing options and intellectual property possibilities.<sup>48</sup>

The breadth of disciplines, motives and applications I have just described as concerned with varieties, leads to the development of a range of specialised terms, many only used in specific contexts: *modern variety*, *farmer variety*, *traditional variety*, *organic variety*, *cultivar*, *hybrid*, *landrace*, *conservation variety*, *population*, *variety mixture* and *historic variety*, to name the most common (Kliem & Tschersich, 2017). Which of the terms is used for which plant population is determined by context and purpose.

I distinguish two general groups of plant cultivars, by degree of uniformity (similar distinctions are made from crop history by Banzhaf, 2016; and Kloppenburg, 2004). The first group is characterised by a high degree of uniformity (*modern varieties* and *hybrids* are the main representatives). They are obtained by modern breeding methods. Plants propagated from those seeds do not adapt their appearance and behaviour to external conditions but show the same traits in different environments. The second group of terms collects varieties that have emerged by less technical, artisanal breeding techniques, or without formal breeding (such as intuitive selection by farmers and long-term adaptation to specific environments). Within this group, I place *landraces*, *farmer varieties*, *traditional varieties*, *variety mixtures*, *populations*, *cultivars*, *conservation varieties* and *historic varieties*. Those plant populations show more diversity in application. Appearance and traits of the plants might change considerably under different conditions. Their importance for robust local economies and food security is acknowledged by the FAO:

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48 In Germany, for example, calling ones plants a variety (Sorte) requires testing and registration with national authority. Deciding to call it an amateur variety (Amateursorte), makes registration possible without testing, hence accepting a wider range of plants as varieties. However, the latter registration comes with economic impediments, such as only being allowed to sell a few grams of seeds at a time.

“Traditional varieties of crops (also called landraces) are the product of selection carried out by local farmers over long periods in their fields and through exchange with other farmers. They are very well adapted to the local conditions under which they were developed (marginal areas with low and variable rainfall and poor soils) but, under more favourable conditions (higher, more dependable rainfall and fertile soils), will tend to have lower yields than modern varieties. They are also well suited to traditional local socio-cultural needs. They have high levels of genetic diversity: not all plants are identical – some will be taller, faster maturing or more disease- or pest-resistant or are rich in micronutrients. Farmers growing traditional varieties will usually grow many different crops, which further reduces risk and enhances food security.” (FAO, 2018a, p. 9)

The high degree of disparity within farmer varieties are a challenge for industrialised farming. At the same time, these less uniform varieties are able to adapt to changing environmental conditions due to their broader genetic base. It is difficult to demarcate the terms clearly, as the distinction is a formal one. In practice, only sufficiently uniform varieties can be officially registered as varieties under national legislation, while more diverse ones cannot meet the regulative criteria.

**Old varieties** (also **heirloom plants**) pop up as a term when reading scientific literature on artisanal breeding and agrobiodiversity. It is not uniformly defined. Legally, it refers to crop varieties which are not registered anymore or never had registration. Colloquially, it refers to landraces which are known to have been already historically used. How important are these old varieties for the farmer-breeders of MASIPAG and Kultursaat e. V? Upon asking, Kultursaat’s breeders negated their use: Yields are too low with most of them, fruits can be too bitter for current consumer’s palates and their lack of uniformity in growth and maturation are challenging. Old varieties are seldom used for breeding as well, as modern varieties have made such leaps in yield that buffering the discrepancy is lengthy and too cumbersome for artisanal breeding. MASIPAG on the other hand saves and uses what they call traditional varieties, both for breeding and crop production. The way they are described by the network make them sound synonymous to heirloom varieties. Apart from my case studies, in modern high-tech breeding heirloom varieties are used to isolate specific traits, such as resistance, and include them in modern breeds.

To conclude: I work with various nuances of the term variety. The understanding of *variety* is a core defining principle in the included case studies. The stance farmers and breeders take differs, due to the specific aims and the contexts they work in. I will specify the term for particular contexts whenever necessary.

*Terminology: farmer-breeders, seed practices, farmers' rights, breeders' privilege, and agrobiodiversity*

Seed research uses its own terminology. The most relevant for this thesis is introduced here.

**Farmer-breeders:** Throughout the thesis, farmer-breeders are mentioned as central actors in seed systems. The term farmer-breeder describes professional farmers, who develop varieties as well. In the Philippines, these are small-scale farmers who adapt existing landraces to their specific environmental conditions, or breed new landraces by crossing existing landraces with desirable traits to meet specific farming needs. They are thereby able to overcome farming challenges caused by a lack of suitable, affordable rice varieties.<sup>49</sup> The German farmer-breeders featured in this thesis also run commercial farms but see themselves primarily as breeders. They breed organic varieties suitable for commercial farming, as these are currently lacking in Europe. They also breed from a moral standpoint of preserving and enhancing cultural heritage and biodiversity for future generations.<sup>50</sup>

**Seed practices:** Farmer-breeders handle seeds in various seed practices.

- *Seed saving* is the practice of keeping seeds from one's harvest to replant them in the next growing season. Saving seeds is cheaper than buying new ones every season. Farmers may however prefer to buy seeds regularly to ensure stable quality.
- *Seed sharing* is giving (saved) seeds to other farmers within or beyond the community. This can be small quantities for trial or assisting with a full amount sufficient for planting a field.
- *Seed multiplication* is the practice of planting selected quality seeds with the intention of harvesting seeds for further use.
- *Plant breeding* means to alter a plant population according to pre-determined breeding goals (such as higher yield or a certain pest resistance). It starts with simple selection anyone can perform in their home garden and ends with high-tech genetic alteration. More on breeding in a following section.

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49 Further information is given when introducing the case studies and in Bachmann et al. (2009).

50 Further information again in the case study introduction and in Sievers-Glotzbach et al. (2021).



- *Conservation breeding* is breeding undertaken not to create a new variety, but to preserve the traits of an existing variety against environmental pressures. As all plant populations naturally evolve over time, it is necessary to apply conservation breeding to keep a variety true to its description.

Seed saving, seed sharing, breeding, and conservation breeding can, in practice, not be clearly demarcated. Each of these practices are part of the collective breeding system, as some form of selection (vigour, seed size, colour, etc.) or genetic mix (in sharing seed, for example) takes part in all of them.<sup>51</sup>

**Farmers’ rights and breeders’ privilege:** Historically, two types of rights have developed from these practices: Farmers’ rights (or farmers’ privilege) and breeders’ exemption (or breeders’ privilege). Farmers’ privilege describes “the practice of farmers sowing crops with saved seed” (P. W. B. Phillips, 2007). Breeders’ privilege, or plant breeders rights (PBRs), “allow the use of others’ proprietary germplasm when breeding new varieties” (Moschini & Yerokhin, 2007), meaning that breeders have access to all given varieties for use as parent material for novel breeds, even if they were bred by another breeder. The two privileges do not oppose, but complement each other.

**Agrobiodiversity:** In using seed practices, farmer-breeders have been creating a multitude of different varieties in the past millennia, also called crop biodiversity. Crop biodiversity is a part of agrobiodiversity, which is defined by the FAO (2018a) as:

“The variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators), and those in the wider environment that support agroecosystems (agricultural, pastoral, forest and aquatic), as well as the diversity of the agro-ecosystems.”

Agrobiodiversity includes both diversity of cultivars and varieties as well as genetic variation within a single variety. Agrobiodiversity can be seen as a living repository for traits, stored in the genes of wild, traditional, and modern varieties. It is the biological tool shed of breeding. Preserving agrobiodiversity is essential for modern breeding (Cardinale et al., 2012; GAFF 2016) and farmers are identified as the most important actors to preserve agrobiodiversity

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51 Personal note A. Christinck, 12.05.2019.

(Pautasso et al., 2013). Some of the conserved traits might have been negligible for centuries but prove to be useful again for modern varieties, under contemporary changing climatic and environmental conditions.

Agrobiodiversity is also vital for resilience at a farm level. It helps to sustain yields in marginal farming areas, provide natural disease and pest regulation, as well as pollination, and enhance nutrient and water cycles (Altieri et al., 2015; Cabell & Oelofse, 2012; FAO, 2004; Hajjar et al., 2008; Hooper et al., 2005; Letourneau et al., 2011).

In this thesis the terms agrobiodiversity and crop diversity are used synonymously, as the publications quoted here on agrobiodiversity refer to plant varieties.

### *The seed value chain*

The simplest form of a seed value chain is described in the historical part of the introduction to this chapter: Seeds are saved and bred on-farm and varieties are infrequently exchanged between farmer-breeders. While this form of seed system still exists in parts of the world or for certain (minor) crops, most seeds are part of an industrialised value chain.

The seed value chain has been growing more complex since seeds are not produced in farming communities anymore. Breeding, seed treatment, multiplication, distribution, as well as laboratory screening in between, can all happen under one roof, but are mostly divided between specialised companies (Mammana, 2014).

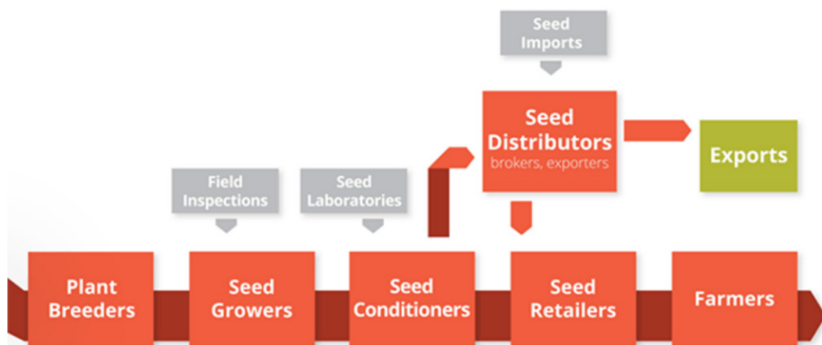


Figure 5: Value chain of modern seed markets. Source: Canadian agricultural office

Breeding companies (plant breeders) develop new varieties.<sup>52</sup> The new variety is then registered by the breeder or breeding company with the authorities (in this depiction they would be placed between plant breeders and seed growers). Once approved and officially listed, the variety can be taken on by retailers. Retailers will pay royalties to the breeding company and pay multipliers (seed growers) to produce larger quantities of seeds for sale. Multipliers are specialists or farmers who have diversified their business to include this commissioned work. Authorities keep track of multiplication contracts and do random field inspections to ensure seed quality. After multiplication, seeds are cleaned, checked for their quality and, in conventional seed production, conditioned with fungicides and chemicals, which aid germination. This might be done in-house at the retailers or contracted to specialised companies. Retailers then package and sell the seeds, either directly or via seed distributors. These production steps frequently happen across borders, as retailers are mainly based in the western world, but weather conditions for seed multiplication are more favourable in warmer countries and wages are cheaper. Farmers are consumers of seeds in this value chain. They can choose amongst offered varieties but are only allowed to save or alter them depending on the legal conditions they agree to upon purchase.

### **Boundaries of seed practices in modern seed systems: three kinds of enclosures and the sustainability challenges connected to them**

In Germany and the Philippines, the industrial seed system is the dominant one. Alternatives are possible, but restricted. When working with seeds there are three distinct boundaries farmer-breeders must comply with, that curtail their seed practices. In commons terminology, they are called enclosures, which develop to ensure quality, marketability and commodification of seeds and varieties in a private property system. These enclosures are introduced in detail in this chapter. First are biological enclosures, which stem from the way modern varieties are bred. Second, legal enclosures, set in place to ensure seed quality for farmers and recognize intellectual property of breeders. Third, economic enclosures, which are a result of market concentration.

Seeds are enclosed to make them marketable, as they naturally are quite unsuited as commodities. Why? One reason is that one of the central biological functions of seeds is multiplication. Their vigorous reproduction creates a constant abundance of new seeds and economically, what is abundant has a low

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52 To find parent varieties, they may draw on independent seed banks, which would be a step taken before those depicted in the value chain.

price. Another reason is that several of humanities' main crops (wheat, maize, rice, potatoes) are sold as food in the same form as they can be planted. That means that in order to harvest them for human consumption they go through the complete maturation process. Consumers eat the seed or propagation material itself and could just as well sow it.<sup>53</sup> It is therefore disproportionately cumbersome to exclude third parties from acquiring seeds.

That modern seed markets nevertheless exist, is due to the three types of enclosures mentioned above. They function separately and build on each other. To get a good overview of both the enclosures themselves and their dynamics, they are described in the following, starting with the biological.

### *Biological enclosures*

Why would farmers pay for seeds if they can save their own seeds, breed new landraces, or exchange seeds with others? One part of the answer is biological enclosures. To control seeds, their biological characteristics need to be controlled: uniformity, stability, and finally reproducibility. This is realised through specific types of breeding. In practice, through this control of characteristics, either buying new seeds is incentivised (new seeds with desirable traits), or their replanting prevented, or both.

How are biological enclosures realised through breeding? While the underlying aim of breeding remains the production of better varieties, economic viability is also crucial. With market competition and new plant stresses in climate change, multiple breeding goals are relevant to breeders, including exclusivity.

1. Novelty of traits. Novel plant traits which benefit farmers or meet some of their agricultural challenges (e.g. better drought resistance) are likely to bring a competitive advantage to breeders. Trait innovation is curtailed by natural barriers to crossing. If, for example, a cauliflower variety exhibits a trait which would be desirable for carrots, that trait cannot be biologically transferred via crossing. Breeding techniques which overcome those

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53 This is contrary to a range of vegetables, for example, which consumers enjoy prematurely (from the perspective of the plant). To produce seeds, an extra effort from harvest stage is required. Some vegetables need two years of maturation, including winter storage and replanting, until seeding. Carrots, for example are harvested in the first year and kept for a second only if planted for seed production.

barriers, allowing the crossing of unrelated species or the insertion of bacteria DNA into the plant, produce leap innovation in varieties.<sup>54</sup>

2. Efficiency regarding time and financial input creates market advantage for companies. Artisanal breeding is a lengthy process due to its reliance on coincidence. Mutations occur naturally, but slowly. Waiting for a specific mutation to occur might take a while. Likewise, propagation time slows the process down. After crossing and getting seeds, the plants must grow before the breeder can assess the phenotypes (looks and behaviours of the grown plant) for desirable traits. Breeding control and hence efficiency is enhanced by breeding techniques which increase mutation rates, target mutations at specific gene sections or allow screening of DNA for desirable traits right after mutation.
3. Hindrance of replanting. If seeds cannot be saved and replanted by farmers in the next season, that ensures higher return on investments for companies. Farmers must then buy seeds every year. The two ways to achieve this is to either sell sterilised seed or seed that only produces uniform and stable plants for one generation (hybrids, for example).
4. Agrochemical compatibility. Another marketing technique worth mentioning in this context is breeding varieties to be resistant to a certain herbicide.<sup>55</sup> The company's agrochemical is then sold in bundle with the seed, which ensures higher turnover.

These goals are realised at various points in the **breeding process**. Every breeding process passes through three general steps (Messmer et al., 2015). These steps are then undertaken with different techniques, depending on the breeding approach.

- First, genetic variation is produced through any procedure which alters the plant genes. Their offspring will show new and hopefully desirable traits. Genetic variation can be achieved in several ways; examples are crossing of existing varieties or artificial induction of mutations on cell level through UV radiation. A population of plants with new gene combinations is then raised.

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54 Such as, for example, BT-cotton, which produces its own insecticide thanks to the insertion of DNA from the soil bacteria *Bacillus thuringiensis*. More on the techniques in question later and in *Appendix D: Breeding Methods – An Overview*.

55 In this way, the chemical can be applied on a field exhaustively and at any point of time to get rid of weeds. Weeding then becomes superfluous, increasing farming efficiency.

- The second step is selection, where plants with desirable traits are chosen from the plant population over the span of 6 to 10 plant generations (F6-F10 in breeders' lingo; Messmer et al., 2015). After this time, the variety is stable in its traits and can be registered with the state (see the following sub-chapter on seed law).
- The third and final step of breeding is conservation and propagation of the new variety. The new variety can now be propagated for sale. Over the following years, to keep the variety exactly as it has been described, conservation breeding is necessary. This simply means that breeders keep planting the variety and select only the plants which conform to its original description for seed production. If this is not done, varieties will change traits over time to adapt to their environments or due to accidental crossing with other (wild) varieties.

Messmer et al. (2015, p. 12) point out that:

“In each of the three steps, various techniques can be applied to different anatomical levels of a plant:

- Whole plant level**, i.e., the single plant, its progeny, or a population
- Tissue level**, i.e., the plant parts, organs, or cell cultures
- Cell level**, i.e., an isolated single cell, protoplasts, pollen, or egg cell
- DNA level**, i.e., the nuclear DNA or extra-chromosomal DNA”

To get a better idea of the breeding relevant in this thesis, three stylised breeding approaches and their critiques are described (following Messmer et al., 2015): artisanal breeding (which is what the practitioners from my case studies use), hybridisation (which they are critical about) and genetic modification (which they are opposed to). *Appendix D: Breeding Methods – An Overview*, gives a further summary of what is currently possible in breeding for interested readers.

**Artisanal breeding:** Crossing and selection are the basic techniques of breeding. Breeders produce targeted crosses from distinct parental varieties, whose traits they want combined (first step). They choose one parent as the mother and emasculate<sup>56</sup> its flowers. These are then cross-pollinated with pollen of the father variety. Seeds grow on the mother plant and are sown for selection

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56 For most plant species, male and female reproductive organs are located in the same flower (they are *monoecious hermaphrodite*) or in separate flowers on the same plant (*monoecious unisexual*). To create a mother-plant for breeding, the male flowers or flower parts are cut. This way, self-pollination, or unwanted cross-pollination from a third variety in the vicinity is prevented.

(second step) in the next season. This offspring<sup>57</sup> consists of heterogeneous plants, which have all inherited a different combination of parental traits. The breeder selects plants with desirable trait combinations through observation of the phenotype<sup>58</sup> repeatedly over at least six generations, to receive a new, stable variety. Seeds are then mass propagated (third step) for sale and the variety maintained through conservation breeding. The breeding process takes about 3 years for rice breeding with two planting seasons a year, 6 to 10 years for vegetables and about 15 to 20 for fruit trees.<sup>59</sup>

Crossing and selection, although a lengthy process, is still used and generally works at the whole plant level. Its efficiency can be raised by combining it with screening methods (tissue, cell, or DNA level) or marker assisted selection (DNA level; see below), to identify desirable traits in early offspring generations by evaluating their genetics.

Varieties developed through artisanal breeding are also referred to as *open-pollinating varieties*. This means that the reproductive organs of the plants are intact, and they can be stably reproduced by farmers and farmer-breeders.

This breeding process is criticised for its lengthy timeframe, inefficiency in selection and inability to produce larger innovative leaps (Ammann, 2008).

**Hybrid breeding** is a breeding technique developed around 1910. Technically, it does not differ much from classical crossing, except for one detail: to generate parent lines, varieties are consistently inbred (crossed with themselves; also called *selfing*), until their genes are identical on all corresponding chromosomes. In the next step, both inbred parents are crossed as described above. The resulting progeny is highly uniform and, for many species, exhibits above-average vigour and yield (*heterosis effect*). Seeds are sold from this first generation (F1)<sup>60</sup>, not stabilised over several generations as in artisanal breeding.

A characteristic of this breeding technique: when replanting seeds of F1, it leads to a broad splitting of traits in the next generation (F2), due to the Mendelian principles of inheritance (as traits are not stabilised). The variety's uniformity in F1 stems from the missing genetic diversity of the inbred parents. In practice, yields decrease in the second generation and agronomical criteria

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57 Called progeny, when referring to the whole offspring population.

58 What the plant looks like (height, fruit size, colour, and so on), and how it behaves (when it germinates, ripens, quantity of nutrients it uses, and amount of rain it can bear, and so on).

59 Information received from breeders of the associations MASIPAG, Kultursaat e. V. and apfel:gut e. V. For the latter, see the work of Wolter (2023).

60 The biological term for it is *filial generation 1* or, for short, *F1*. When buying seeds, hybrids are most often apparent only from the addition of "F1" behind the variety name.

(such as maturation dates, plant height, ...) within the population vary, making this form of plant generation unsuitable for mechanised farming. Farmers must therefore, rebuy hybrid seeds every season. This ensures economic turnover for companies. At the same time, hybrids are difficult for breeders to maintain, because, to continuously produce new F1 seeds, elaborate conservation breeding is required for the inbred parent lines.

Hybridisation is widely used in modern breeding. Just like crossing and selection, it works on the whole plant level. Although commonly causing confusion, hybrid varieties are not necessarily a product of genetic engineering. In theory, you could produce hybrids in your home garden.

To abbreviate the time-consuming precursory step of selfing parent lines (which takes about 5–6 years; Yan et al., 2017), CMS-technology (cytoplasmic male sterility) and tissue culture can be used (see *Appendix D: Breeding Methods – An Overview*). Both procedures can produce plants with genetically identical chromosome pairs (biologists call them homozygous) in one breeding step.

Hybrid varieties are criticised for their replanting restrictions. It is argued that they impede farmers' rights and seed sovereignty (Kloppenborg, 2014; Pautasso et al., 2013; Shiva, 1991). Hybrids are also blamed for causing genetic erosion (Sievers-Glotzbach et al., 2020; van de Wouw et al., 2009; Wattnem, 2016). This latter critique is stated not only for hybrids, but modern varieties in general. Another major modern breeding technique, and the last one introduced here, is genetic engineering.

**Genetic engineering** is a blanket term for all procedures, which genetically alter plants in a way that would not naturally be possible. It mainly refers to procedures on a genetic level, within the first breeding step of *production of genetic variation*, namely gene transfer (see *Appendix D: Breeding Methods – An Overview*).<sup>61</sup> A specialised and recent form of genetic engineering is **gene**

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61 Genetic engineering is a contested term from two opposing perspectives: German law (Gentechnikgesetz, GenTG §3) and conventional breeders, understand genetic engineering precisely as described above. Organic farming associations include a processual perspective in which they count all procedures which compromise the integrity of plants on a genetic or cellular level as genetic engineering. These conflicting views become especially visible in the question, to what extent cell fusion counts as genetic engineering: the law only counts it if the result of cell fusion could in no way have been produced naturally, while organic farming associations point to the invasive process and see any cell fusion as genetic engineering. This results in practical challenges, as seeds produced by genetic engineering need to be labelled in Germany, but according to law, not all products of cell fusion need this label. At the same time, organic farming associations forbid the use of genetically engineered seeds,



**editing.** It was developed in 2012 (Siebert et al., 2018). Gene editing refers to more targeted procedures of genetic engineering, the most well-known is CRISPR/Cas. It is cheaper than standard genetic engineering technology and has a higher success rate. A mental approximation of how it works are gene scissors, which cut DNA in a predefined place. Mutation is induced, because either the organism repairs the cut with its own DNA or with DNA that is introduced into the cell along with the gene scissors. Proponents argue for the natural features of the procedure, as alien DNA is not necessarily used. Opponents view it as essentially a genetic engineering procedure and want to subsume it under the existing GenTG law.

Genetic engineering can produce innovative leaps and is time effective. On the other hand, it is expensive and requires elaborate laboratories. Proponents of gene editing advocate for the new technique to democratise the breeding market, as it is cheaper than genetic engineering methods and could therefore, allow new participants to enter the market.

That **modern breeding techniques** are critiqued for causing genetic erosion, is mentioned above. They tend to narrow genetics within plants to suit consumer preferences and facilitate transport and storage. As a downside, narrow genetics impede adaptability and hence resilience of varieties. This is especially problematic in facing the issues of climate change. At the same time, society's habituation to uniform varieties creates lock-ins for farmers. If they use genetically broad varieties, they are not able to sell all their produce to retailers because of aesthetic and other normalising criteria.<sup>62</sup>

Genetic engineering is also criticised for its risks to health and environment by organic practitioners (Lammerts van Bueren & Myers, 2012; Shiva et al., 2013), and viewed as incompatible with organic farming values (IFOAM, 2017; Lammerts van Bueren & Myers, 2012) such as, the inherent value of living organisms. Social critique is first, that technological seeds are not scale neutral (K. Fischer, 2016), meaning that they are not equally beneficial for small and large scale farming. This has produced negative social effects in the Asian Green Revolution (1960's and 70's) and is likely to repeat in the upcoming African Green Revolution, according to Fischer (ibid.), if not adequately considered. A second social critique links to breeding highly homogenous plants with little genetic variance. To fit varieties to modern agricultural techniques, uniformity is a central breeding goal. Climate change adaptation requires high

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or their derivatives, and count every product of cell fusion. This "causes considerable uncertainty in organic farming." (Messmer et al., 2015, p. 10)

62 Informal conversations with Kultursaat e. V. farmer-breeders.

genetic diversity within cultivars and varieties, however. Critics worry that the current breeding trajectory aids biodiversity loss and impedes the food security of future generations, while artisanal breeding structures enhance both aspects (Serpoly et al., 2011; Villa et al., 2005).

For farmer-breeders modern breeding techniques mean that they cannot engage in the full range of seed practices, as modern varieties behave biologically differently. Seed saving is especially hampered and discouraged. Furthermore, modern varieties are seldom fit for organic agriculture, which many farmer-breeders prefer ethically, or practice as a necessity, due to financial restrictions.

### *Legal enclosures*

Legal enclosures are the second type of restriction farmer-breeders face. Authorities view seeds and their varieties as a function of agriculture. Hence, it has a narrower definition than the biological one (which was cited above): “seeding material are a) seeds which are meant for the propagation of plants; excluding seeds of fruits and ornamental plants. b) seeding material of potatoes. c) seeding material of grape vines, including twigs and parts of twigs.”<sup>63</sup> (§2 Abs. 1 Saatgutverkehrsgesetz, 1985; own translation).<sup>64</sup> Hence, German seed law regulates only the seeds and seeding material of crop plants which are relevant for commercial use, meaning plants for nutritive or pharmaceutical use.

Seeds are an input factor for agriculture, and farmers working with seeds have to adhere to seed regulation in any of their actions. These are set in place to ensure seed quality, transparency, variety protection and alleviate (cross border) trade of seeds (left to right in). Seed regulations work on several levels: national, supranational (in case of the European Union) and international (bottom to top in *Figure 6*). We will go through all three of them for an overview of the most important regulations.

International treaties provide guidelines on intellectual property rights, biodiversity conservation and handling of genetic resources. Nation states, or in the case of the European Union, supranational groups, which ratify these interna-

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63 A number of crops are cultivated from plant parts (essentially cloned), rather than seeds.

64 German original § 2 Abs. 1 Saatgutverkehrsgesetz, 1985: „1. Saatgut: a) Samen, der zur Erzeugung von Pflanzen bestimmt ist; ausgenommen sind Samen von Obst und Zierpflanzen, b) Pflanzgut von Kartoffel, c) Pflanzgut von Rebe einschließlich Ruten und Rutenteilen; 1a. Vermehrungsmaterial: Pflanzen und Pflanzenteile a) von Gemüse, Obst oder Zierpflanzen, die für die Erzeugung von Pflanzen und Pflanzenteilen, b) von Gemüse und Obst, die sonst zum Anbau bestimmt sind; ausgenommen sind Samen von Gemüse“

tional arrangements, must adhere to them in their national legislation. However, some space for adaptation is left in most international contracts, so nations can model their laws to their specific needs and national agricultural context. No international standards are in place for trade and marketing of seeds. For that, nations develop their own legislation.

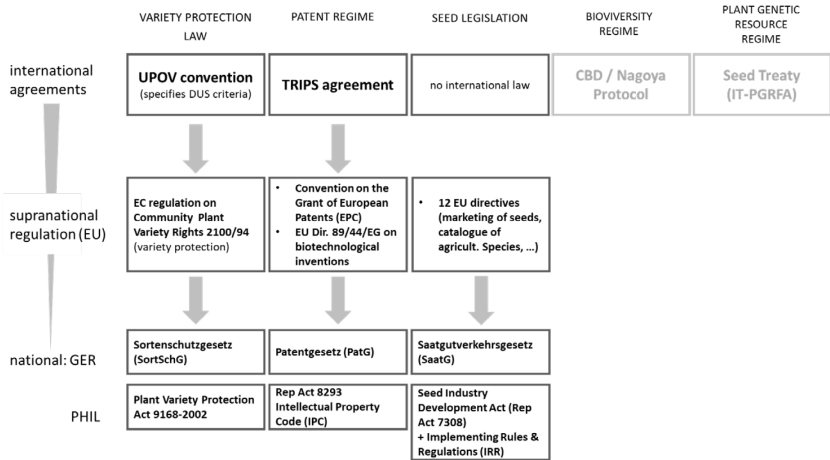


Figure 6: Implementation of international agreements on seeds in (supra-)national seed law (based on Tschersich, 2021)

**International treaties:** On the international level, four conventions and treaties on seeds exist:

1. the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS),
2. the Convention of the International Union for the Protection of New Varieties of Plants (UPOV),
3. the Convention of Biological Diversity (CBD), supplemented by the Nagoya Protocol,
4. and the International Treaty on Plant Genetic Resources for Food and Agriculture (IT-PGRFA or Seed Treaty).

These international arrangements function as institutional complexes (Oberthür & Stokke, 2011; Raustiala & Victor, 2004), at times promoting conflicting norms. While TRIPS and UPOV support breeders' interests and foster a dis-

course of privatisation and food security, the CBD and the Seed Treaty somewhat counterbalance this by emphasizing collective responsibility for plant genetic resources (Tschersich, 2021).

The first two, TRIPS and UPOV (1991)<sup>65</sup>, are concerned with intellectual property rights. They are modelled to incentivise the trade of seeds and the innovation of new varieties between countries. TRIPS is a world trade organisation (WTO) trade agreement and sets international standards for patent regimes. It sets rules for plants in Art. 27 III (b)<sup>66</sup>, where it explains that nations can exclude plants, and essentially biological methods used for their production, from patentability. Nations who agree to TRIPS, however, must devise another suitable intellectual property rights system (*sui generis*) for the legal protection of plant varieties. To do so, most countries use the regulations suggested by UPOV (1991) as their *sui generis*<sup>67</sup> system, as it complies with the demands of TRIPS (Andersen, 2008). UPOV suggests a more specific variety protection regime with strong rights for breeders (Le Buanec, 2006). Following UPOV, breeders have the right to demand royalties for the use of their varieties. Commercial seed multipliers and seed-saving farmers are charged by the respective breeders. Breeders' exemption and farmers' privileges are acknowledged as exceptions; breeders may use protected varieties for further breeding and farmers may farm-save seeds without prior consent of the original breeder. This is a key difference to patent regimes, on which I will say more below. UPOV also sets standards regarding which varieties are suitable for protection: novel breeds must be distinct, sufficiently uniform, stable (these three core criteria are commonly abbreviated as the DUS criteria) and new. It is through these criteria that UPOV has a substantial influence in shaping what the term *variety* means, and which varieties are offered in formal seed markets. Both TRIPS and UPOV have extensive influence on national seed laws in most countries, as they must adhere to TRIPS, and often choose UPOV's relatively precise suggestions to do so.

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65 The UPOV convention was first set in place in 1961 and has been revised several times since. The 1991 version is the one currently in place.

66 TRIPS Art. 27 III: "Members may also exclude from patentability: [...] (b) plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof."

67 *Sui generis* is a legal term referring to nationally individual interpretations of international directives. In this case it describes the national regulations set in place to implement the UPOV convention.

The CBD and the Seed Treaty regulate biodiversity and install “international norms that recognize the collective responsibility of states for conservation and sustainable use” (Tschersich, 2021, p. 8). The CBD does so in more general terms for biodiversity than the Seed Treaty, with a specific focus on plant genetic resources for food and agriculture. Both documents have been agreed upon recently, and are still in the implementation phase, therefore, their implications for seed practices are only beginning to become apparent (Tschersich, 2021). It is fair to say, however, that they mainly address states, academia and larger breeding companies and are hence of little relevance to individual farmers and seed commoners<sup>68</sup> to date (ibid.).<sup>69</sup>

**German and Philippine seed law (national and supranational regulation):**

National legislation specifies the handling of seeds and varieties for every country, including the implementation of international treaties when ratified. For the scope of this thesis, German and Philippine seed law are relevant. Supranational regulation of the EU is necessarily included in the section on German seed law.

**German** seed law must acknowledge both the mentioned international treaties, as Germany has ratified them all, as well as their specifications in EU directives (EU Dir. 2002-53/EC; EU Dir. 2002/55/EC). The latter include regulations of a common, European variety catalogue for agricultural plant species and trade regulations for subgroups of agricultural produce, such as vegetables. German seed law splits into two main bundles: (1) variety protection law (Sortenschutzgesetz: SortSchG), and (2) seed trade law (Saatgutverkehrsgesetz: SaatG). As a rule of thumb, variety protection law is geared towards breeders’ interests, while seed trade law ensures quality standards for farmers and gardeners who buy seeds.

German variety protection law (SortSchG) closely resembles UPOV (1991). It is set in place to incentivise innovation by providing breeders with the possibility to protect their varieties with private property rights. Protected varieties are listed in a European register of Community Plant Variety Rights (Art. 87/88 EC-2100-94). Holding variety protection rights allows breeders to refinance their breeding efforts through royalties. In Germany, breeders may request

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68 Seed commoners are people who actively engage in the creation and maintenance of seed commons. Also see chapter *Seed Commons*.

69 This might change in the future, as both documents are comparably young and their implementation is still in an experimental phase. They might effectively counteract TRIPS and UPOV at some point and then become more relevant for seed practices.

royalties for every seed multiplication of their protected variety, be it for commercial sale or seed saving by farmers. In this way, farmers' privileges are still in place, although they have been curtailed step by step with every revision of UPOV. Only cereals, feed crops, oil-bearing plants, fibre plants and potatoes may be seed saved; the exact species are listed in an addendum of the variety protection law (SortSchG Anlage). The royalty fees requested from farmers for this practice are modest. Vegetable seeds are effectively forbidden to be saved, as they are not included in the list of exceptions to the variety protection law. Full breeders' exemption is acknowledged in Germany, which means that all varieties protected by variety protection law are open to further breeding efforts free of charge. This regulation is set in place to reduce barriers for breeding innovation. The DUS criteria suggested by UPOV for variety protection are already evaluated in registration checks (under seed trade law; SaatG), prior to application for variety protection.

#### **Variety Registration in Germany**

Say you have bred a novel variety and would like to sell it. Which steps do you have to take to get it registered? German seed trade law (SaatG) establishes a variety registration process to determine if a variety is suitable for cultivation and sale.

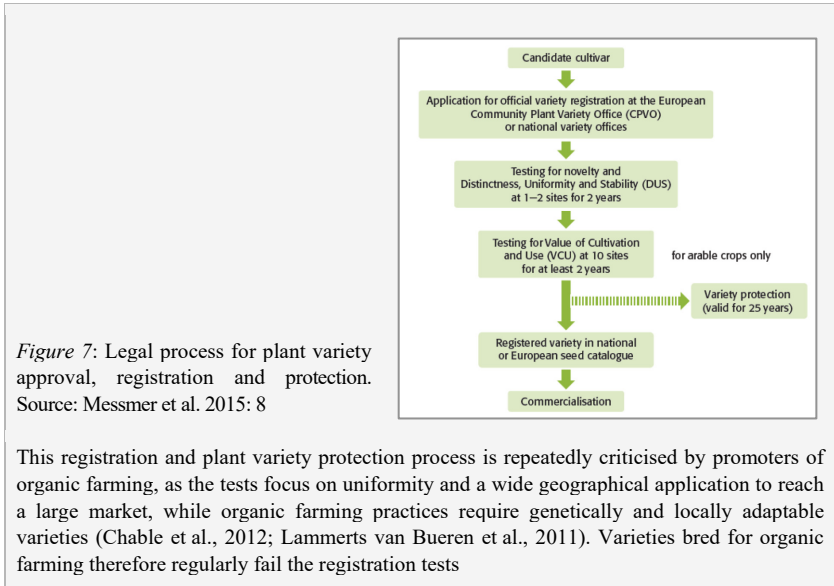
Varieties are given to the German Plant Variety Office (Bundessortenamt) and are tested there in field trials for two years, sometimes at more than one test site. Tests focus on distinctness, uniformity, and stability (DUS criteria).

Arable crops (such as grains) are additionally tested for their value of cultivation and use (VCU) afterwards, which means another two years of testing at ten different sites. VCU tests are required by EU legislation. Yield is a primary factor in this particular trial.

The varieties are then officially registered in the German national seed registry, as well as the European registry and are thereby approved for marketing. Breeders can now decide if they *additionally* want to apply for variety protection. Variety protection, as a mild form of intellectual property right, is valid for 25 years and allows for the request of royalties.<sup>70</sup>

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70 Breeders' and farmers' privileges are not hampered by German variety protection. Seeds are still allowed to be saved or used for further breeding, only royalty fees apply.



Seed trade law (SaatG) has been shown to be too narrow to realise certain socially desirable outcomes, namely conservation of biodiversity regarding traditional varieties and varieties with high cultural value but little yield. Two exceptions are therefore in place: *conservation varieties* (art. 1,4,10 2008/62/ EC & 2009/145/EC), and *amateur varieties* (Art. 21,22 EC/2009/145). These are acknowledged in the SaatG and ErhaltungV<sup>71</sup> in German law. Registration for these variety categories is less strict, especially regarding DUS criteria; quicker, as no field trials are needed; and cheaper. In turn, several restrictions apply to their marketing, in either geographic scope or packaging size. Conservation and amateur varieties are thus an option to preserve biodiversity and allow less professionalised, or less technological breeders to introduce their varieties. These forms of registration are of negligible commercial importance.

**The Philippines** generally share the double legislative system of (1) variety protection with their Plant Variety Protection Act (PVP) and (2) trade law, called the Seed Industry Development Act (RA 7308). The latter is supplemented by Implementing Rules and Regulations (IRR). Philippine seed law differs from German law mainly because the Philippines have not signed UPOV and grant comparably more extensive farmers' rights. The informal

71 German act on conservation varieties (Erhaltungssortenverordnung).

seed sector is prevalent in the Philippines. Farmers are allowed to seed-save and sell seeds of protected varieties to others on their own land without royalty payments (Sec. 43 IPC<sup>72</sup>). The scope of these practices would not be compatible with UPOV (1991). Nevertheless, their variety protection system (PVP) is otherwise closely modelled to UPOV's suggestions.

The Seed Industry Development Act aims to professionalise the Philippine seed sector and to ensure high-quality seed supply through the promotion of plant breeding and public sector seeds (Tschersich, 2021). Quality is ensured through seed analysis and field inspections. Seed market infrastructure is built by compulsory seed labelling, registration of seed merchants and setting of seed standards. In addition to private breeding efforts, the Philippine government breeds and multiplies seed, which they distribute through the National Seed Network. While seed registration is not compulsory for sale, non-registered seed must be labelled differently, and practical repercussions follow their use, such as exclusion from crop insurance or farming credit.

Summing up, varieties generally need to be registered in both countries. However, the Philippines have more liberal seed laws, where it is also legal to grow crops from unregistered varieties and share seeds, even if it is practically discouraged (insurability).

**Patents on seeds:** To round off the overview of seed law in Germany and the Philippines, patents are addressed. Patents are a form of private variety protection, which is not modelled on seeds as an agricultural resource. Their legal protection is stricter than other forms of variety protection. Therefore, they produce potentially problematic outcomes, such as curtailing access to protected varieties for further breeding. These unwanted side effects are addressed in variety protection law, as described above, which is the alternative protection system breeders can use. Nevertheless, both protection systems exist in parallel.

The relevant legislation is the Convention on the Grant of European Patents and, more specifically for plant breeding, the EU Directive on biotechnological inventions, both being implemented in the Patentgesetz (PatG) for Germany. Patents are published in the public registry of the Patent Office (§ 30, 32, 34 PatG). In the Philippines, the Intellectual Property Code (IPC, Rep Act 8293) regulates patents.

Both the Philippines and Germany make use of TRIPS' exception and exclude plants and essentially biological processes, such as artisanal crossing, from

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72 Intellectual Property Code.



patentability. When patenting innovation in a breeding process, however, protection stretches to directly obtained products (Art. 28.1 TRIPS), including essentially derived varieties. In this way, patents on varieties are effectively granted in both countries (even if not frequently for the time being). For Germany, the exceptions to intellectual property rights, which apply for variety protection (farmers' and breeders' privilege) are also applicable to patents. The scope of patents causes uncertainty for breeders, which leads to a reluctance to use patented varieties. The Philippines grant neither farmers' privilege nor breeders' exemption for patents (Sec. 72 IPC).

**Critique towards current seed law:** Some aspects of the legal system are criticised as threatening the long-term sustainability of agricultural production. Most prominently, patents effectively reduce breeders' choices of parent varieties and, due to their scope<sup>73</sup>, create uncertainty in variety choice, as it is not always clear which varieties are included in the patent and which are not. Strict intellectual property rights in general are criticised as detrimentally privatising varieties (Gepts, 2004; Hill & Meiners, 1998; Kloppenburg, 2010; Shiva et al., 2013).

Another critical aspect is the interpretation of the uniformity criterion of DUS, which is currently rather narrow and promotes highly homogenous varieties. Varieties that are genetically more heterogeneous (such as artisanal or organically bred varieties) can often not pass variety registration due to this regulation. The need for formalisation and genetic narrowness for legal registration evokes protest in niche markets, which explicitly demand diversity (Chable et al., 2014). Organic agriculture, for instance, requires (1) genetic breadth within varieties, to reap the benefits of adaptability for low-input farming conditions, and (2) a diverse range of different varieties, if engaging in diversified farming practices. This becomes obvious in Germany, where organic open pollinating varieties, even though bred professionally, routinely fail registration tests by the national plant variety office. Partly because of this, organic farmers lack varieties suitable for low-input organic farming (Serpolay et al., 2011).

Lastly, farmers' privileges are subsequently cut with every revision of UPOV, rendering practices of seed saving and exchange, illegal. While those practices have little relevance in industrialised farming societies such as Germany, small-scale and subsistence farmers in less affluent settings rely on these practices for their livelihoods, as buying seeds is not always economically feasible.

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73 As patents are granted for technological breeding advancements and varieties directly resulting from the novel technology, not for single varieties, they can stretch over several varieties.

Hence, seed legislation can limit seed practices, especially in market niches and the informal seed sector (Frison, 2018a; Wattnem, 2016).

For farmer-breeders, the current law sets high standards, especially regarding the DUS uniformity criterion.<sup>74</sup> Uniformity is harder to achieve through artisanal organic breeding on the one hand, and not desired by farmer-breeders from my case studies, on the other hand, as it conflicts with their organic values and considerations of genetic breadth for climate resilient varieties. Especially in Germany, registration is lengthy and costly<sup>75</sup>, but unavoidable for seed marketing.

The biological breeding aspects above, demonstrate how breeders are able to adapt varieties to farmers' needs and make them marketable. Looking at the legal regime shows how breeding and jurisdiction are interlinked at various points, for example, in the requirement for uniform varieties according to the DUS criteria and the tendency of modern breeding to focus on these highly specialised, hence uniform, varieties. Finally, I will elaborate in the next section, how the seed market is currently organised economically.

### *Economic enclosures*

In a way, biological and legal enclosures are the joint outcome of economic interests (Banzhaf, 2016; Kloppenburg, 2004). Commercial actors are driving biological innovations in the field and are lobbying to get their intellectual property protected in ways that make their breeding efforts profitable. In effect, this leads to highly efficient varieties, but also (directly and indirectly) to consolidated markets (P. H. Howard, 2009, 2015; Mammana, 2014) and dwindling biodiversity (FAO & Commission on Genetic Resources for Food and Agriculture, 2019). This chapter goes into detail about seeds as economic goods and seed market structures, to better understand the economic enclosures actors face.

**Seeds as double goods.** First of all, seeds behave in a unique way as commodities, as both seeds and the genetic information they store are marketed individually (Sievers-Glotzbach et al., 2020). When buying seeds, farmers pay for seeds plus the intellectual property fee of the genetic (varietal) information they store. When saving seeds for the next season, the material commodity is free, but the genetic information as the immaterial commodity, must be paid

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74 This comes to play in Germany more than the Philippines, as varieties need to be registered before being used in agriculture.

75 Around 10.000 € per variety according to a conversation with members of Kultursaat e. V.

for in royalties. On the other hand, seed retailers can buy varieties (the genetic information) from breeders and market them through contractors, without ever having touched a seed of that variety.

For farmer-breeders who decide not to register the varieties they have bred, this means that their varieties could be registered by anyone who buys seeds from them. In this case, they would have no rights to their varieties anymore. In practice, this seldom happens, but the farmer-breeders I work with describe it as a threat they keep in mind.

**Informal and formal seed markets.** Why would, or could, anyone threaten them in the first place? To get an idea of the relevance, size and political-economic power of the initiatives I will present in chapter 4.3 *Case Studies: The German Breeder Association Kultursaat e. V. and the Philippine Farmer-Breeder Network MASIPAG*, what follows is an overview of international and European seed markets.

Figures on seed markets always describe the formal seed market, meaning monetary exchanges of seeds between economic actors in a regulated, and therefore traceable, market system. Let's not forget that there is also an alternative, the **informal seed sector**. It is defined as the "total of seed production activities of farmers, mostly small-scale farmers" (Almekinders, 2000). How large the share of informal seed systems still is in relation to worldwide total seed use is hard to tell, as aggregated data is not available. For single crop species like wheat, about 50% of produce stems from saved seeds even in central Europe (Ragonnaud, 2013).<sup>76</sup> For other crops, seed saving plays virtually no role. In non-European countries with larger shares of subsistence agriculture, up to 95% of seeds are saved for local staple crops such as sorghum or millet (Almekinders, 2000).

In **formal seed markets**, a few crop species are disproportionately important. Internationally, grains like maize, wheat and rice currently represent almost half of global seed production (IMARC, 2019). Starting in the 20<sup>th</sup> century,

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76 Figures exist for specific crops and countries. Biodiversity International quotes several papers showing that the formal seed sector has not yet reached all corners and crops of the earth. "The formal sector provides less than 5% of the seeds used to produce traditional staple crops in West Africa (sorghum, millet, cowpea), in spite of decades of breeding work. It provides less than 10% of the rice in Nepal, where it is a major crop. In Ethiopia and Syria, important wheat-growing areas, wheat production depends from 80 to 90% on informal seed sources." (Biodiversity International, 2017, p. 82). While some of these figures are almost 20 years old and the advance of the formal seed sector might have proceeded, it is valuable to keep informal seed markets in mind as possible exceptions, even in Europe (Almekinders, 2000).

fewer and fewer edible plants were used as crops. Out of 7000 species historically used as food, humanity nowadays focuses on 30 crops to satisfy 90% of calorie consumption (FAO, 1997; Haußmann & Parzies, 2009). Half of the calories consumed stem from three species: wheat, rice, and maize (*ibid.*).<sup>77</sup>

Investigating reliable figures on seed market shares proves a cumbersome task. There are two reasons. First, the seed industry keeps its secrets and the information officially disclosed is patchy (Mammana, 2014). Market research institutes hold relevant data, but detailed information is not freely available. The figures provided by governmental and supranational institutions read as guesstimates, collected in informal meetings from “confidential industry sources” (Mammana, 2014, p. 8). Second, with a lack of official data and due to its political nature, discussions on seed market shares and consolidation in the industry are controversial and normative. Two opposing factions argue, one for a further industrialisation of seed supply, and one for seed regimes with room for alternatives. The former denies occurrence of seed market concentration, and the latter tries to prove it in order to push political sanctions. Therefore, depending on the source, figures vary considerably across all publications.

**The global seed market**<sup>78</sup> was valued at 60-67 billion USD in 2018 (IMARC, 2019; MI, 2018b). It is a growing industry with estimated annual growth rates of 3.4% – 7.9% (AMR, 2017; IMARC, 2019; MI, 2018b). North America comprises the largest market with about 35% of global seed sales<sup>79</sup> (MI, 2018b).

Multinational agrochemical and seed corporations are mostly based in Europe, North America, and of late, Asia.<sup>80</sup> Main players are Bayer-Monsanto, DuPont de Nemours, ChemChina (who have bought Syngenta in recent years) and Dow, Inc. (IMARC, 2019).

We look at the three currently most important types of seeds: genetically modified seed, conventional seed (mostly hybrids) and organic seeds. Genetically modified (GM) seed is already sold more than conventional seed, according to marketing institute sources (AMR, 2017). Political and scientific sources work

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77 More recent figures are missing in current literature.

78 Most data is taken from international market research agencies, which have published reports on the international (organic) seed industry available for sale in recent years (Allied Market Research, 2017; Grand View Research, 2016; IMARC Group, 2019; Mordor Intelligence, 2018b, 2018a, 2020; Transparency Market Research, 2017). General market figures are disclosed to advertise for the reports, which are used for this review. To improve readability, the documents will be abbreviated as: AMR, GVR, IMARC, MI a/b and TMR.

79 Figures for 2018 (MI, 2018b).

80 Of the top 20, two are based in the US, 12 in Europe and six in Asia (Zhang, 2017).

with more cautious numbers, estimating GM seeds account for between a third and almost half of total seed sales (Bonny, 2014; Ragonnaud, 2013).<sup>81</sup> The success of GM seed over conventional seed varies considerably depending on crops and country.<sup>82</sup> In Europe, GM seeds are almost irrelevant (Schnurr, 2015), due to legal regulation and public rejection. No specific numbers are found for the Philippines.

The second sector, conventional seed, is roughly the negative image of GM seeds – whichever market shares are not comprised of GM seeds, are conventional seeds.

The third sector, organic seed<sup>83</sup>, is currently almost negligible. It has a market value of 1,6 billion USD in 2018 (MI, 2018a), which is 2,4–2,7% of the global international seed market turnover (calculated against the above figures, as researched). Organic seeds are nevertheless included in detail here, as this is the sector the farmer-breeders from my case studies breed for. It is expected to grow substantially on a global scale, in forthcoming years<sup>84</sup>, because of increasing consumer demand (TMR, 2017). Vegetable seeds account for the largest share of organic seed sales, with over 30% in turnover (GVR, 2016; figures for 2014). This is in disparity with the conventional and GM seed markets, where grains are the most important crops.

The **Philippine seed market** is different to the European market. Rice is the archipelago's main crop. Over 50% of rice seeds were non-hybrids and non-GM in 2019 (MI, 2020). Besides the large adoption rate of open pollinating

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81 The deviance of these figures could also be due to a drastic rise in GM seed sales in the three years between the quoted assessments, as they have exhibited growth rates of over 20% for five year periods before (Ragonnaud, 2013).

82 For cotton and soybean, GMOs are globally prevalent already (over 80%). Canola and maize are both produced from GM seeds by over 30% (ibid.; figures from 2012/13). Other important staple and cash crops, like wheat and rice, appear to exhibit negligible shares in GM seed sales, as they are not mentioned in the study. In addition, GM seeds are not adopted evenly throughout all regions and countries. They are especially successful in North and Latin America, where in some countries GM adoption rates have reached over 90% for various cash crops (Ragonnaud, 2013; TMR, 2017).

83 The term *organic seeds* refers to seed produced under organic conditions before sale (Art. 12 lit. i, European Organic Regulation). The breeding process, as well as parent material can be conventional and hybrids can be used unless further restrictions of organic growers' associations apply, e.g., Bioland or Demeter. Some countries and regions, e.g., the EU, require organic producers to use organic seeds, if available, others leave the decision to the farmers, e.g., the US. Although minor breeding programs exist dedicated specifically to open pollinated, purely organic varieties (= organically bred varieties), more than 95% of global organic produce stems from conventionally bred varieties (Lammerts van Bueren et al., 2011).

84 With predicted annual growth rates of 12.7% – 13,6% (MI, 2018a; GVR, 2016).

varieties (not all of them necessarily organic seeds), the actor structure is distinct in the Philippines. Less than 10 % of rice varieties on the market are bred by private actors, such as companies. Most of the varieties stem from the public international and national breeding institutions IRRI and PhilRice (ibid.). The Philippine Department of Agriculture promotes adoption of hybrid varieties in the hope of higher yields, as the country is not self-sufficient in rice, but imports from neighbouring countries (ibid.). Interest groups of small-scale farmers oppose the hybrid trend, pointing to the negative economic and social effects the Green Revolution had for small scale farmers in the country (Bachmann et al., 2009). All in all, the Philippine market remains relatively open in seed choice, as well as farmers' rights and breeders' privileges.

**The European seed market**<sup>85</sup> is substantial (20% of global seed sales; Ragonnaud, 2013), and more than half of the 20 leading seed and agrochemical corporations have their headquarters in an EU country. It is difficult to clearly delineate “the” EU seed market, as it is dominated by private actors (Mammana, 2014), who are globalised businesses, and seed value chains are international.

Europe has a history of breeding. Its most iconic and traditional seed innovators and producers are France and the Netherlands (Zhang, 2017). Up to the present day, the EU seed market is growing substantially (Ragonnaud, 2013)<sup>86, 87</sup>. Similar to the world seed market, grains (39%) and corn (26%) are the most important crops.<sup>88</sup> The EU seed market is a non-GMO market (except for a limited number of GM trials), due to strict regulations and consumer scepticism. No data can be found on the number of organic seeds in Europe, but, according to Eurostat<sup>89</sup>, 8.5% of EU agricultural land was farmed organically in 2019. Organic seeds should then roughly make up that percentage.

**Critique: Consolidation in the seed market.** A concern for the global seed industry is its consolidation. Howard (2009)<sup>90</sup> approximates inefficient market

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85 There are no distinct assessments for Germany.

86 Even if not as steeply as the world total. Between 2005–2012, +45% in sales were recorded for the EU seed market (ibid.). Worldwide, seed sales experienced +76% in the same time-frame (ibid.).

87 Not all European countries are equally engaged. The biggest seed buyers are France, Germany and Italy (Ragonnaud, 2013).

88 Potatoes (14%), vegetables (11%), as well as oil/fibre crops, sugar beet and grasses (3–4% each) complete the picture (ibid.).

89 [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Organic\\_farming\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Organic_farming_statistics)

90 See also his extensive and recent map *seed Industry Structure 1996–2018*, available online: <https://philhowardnet.files.wordpress.com/2018/12/seed2018-1.pdf>.

concentration. Markets are consolidated when four companies hold 40% of market shares or more. In the global seed industry the top four companies shared 56% of seed market turnover as early as 2009 (P. H. Howard, 2009).<sup>91, 92</sup>

Strong consolidation leads to economic inefficiency and market failures. Bonny (2014) furthermore raises the issue of crop orphan sectors in consolidated markets: As corporations tend to concentrate their R&D efforts on widely used crops with high promises for returns on investment (due to mass global sales), they neglect less profitable, but regionally vital crops (e.g. African root crops).<sup>93</sup> With current market consolidation, smaller businesses, which have so far cushioned this problem by breeding minor crops, may get absorbed in the future. Bonny sees the concentration trend continue for the GM seed sector<sup>94</sup>.

Markets for genetically modified seeds tend to be more consolidated than conventional seed markets (Bonny, 2014). In general, “experts have described the emergence of biotechnologies as the key driver of the consolidation process that has taken place in the global seed industry.” (Ragonnaud, 2013, p. 7). Part of that is due to stronger intellectual property rights for GM varieties, which make it more difficult for other breeders to adopt recent innovations. Furthermore, breeding of GM varieties requires intensive high-tech and, with that,

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91 Estimates of consolidation vary, but several exceed Howard’s 40% rule of thumb: the European parliament worked with figures of 48% for the top four companies in 2012 (Ragonnaud, 2013), a widely quoted study by the ETC group estimates 58% for the same companies and year (ETC-Group, 2013). The latter go further stating that the largest 10 companies have a worldwide market share of 75.3% (ETC-Group, 2013). A market research institute reported less critical numbers - a 50% market share of the top eight companies - as late as 2018 (MI, 2018b). A conclusion can hardly be drawn under scientific scrutiny.

92 Some of the corporations specialise in certain crops (for example, two Dutch companies focusing on vegetables and turf grass respectively; Zhang, 2017) and control market shares exceeding the general estimate in those particular areas. The consolidation trend is unlikely to change in the near future, unless political steps are taken, as new companies are unlikely to enter the market due to economic entry barriers such as required investment, genetic resources and experience (Ragonnaud, 2013).

93 If you remember above, these are also the crops for which the largest informal seed markets exist.

94 From the perspective of the total food chain, consolidation of the seed industry is not the most troublesome factor: “Despite the rapid growth and significant weight of the top agrobiotech companies, the influence of downstream sectors on the food chain remains dominant. Although some big seed companies have acquired other enterprises and today represent a high share of global seed sales, the economic weight of the seed industry remains small within the food chain. The downstream sectors act powerfully upon the entire food chain, notably through their requirements and their influence on consumption patterns, as well as on agricultural and food prices.” (Bonny, 2014).

financial resources. It is thus most affordable for already large companies. The organic seed market is less consolidated than the conventional and GM markets (MI, 2018a). Most of the organic seed market is composed of smaller, regional seed companies (MI, 2018a; GVR, 2016).<sup>95</sup>

The EU seed market, as a non-GM market, is therefore less consolidated than the global market (Ragonnaud, 2013). Still, the current market concentration is recognised as critical (Mammanna, 2014). The market power of the European seed industry can, for example, be seen in notable price increases, as seeds have globally become 30% more expensive between 2000 and 2008 alone (ibid.). While the overall EU market is quite diverse, concentration processes do occur for specific countries and crops (ibid.). For example, five companies control 75% of corn seed sales (figures for 2021/13; ibid.). Contrarily, 50% of cereal seeds are saved seeds (Vilmorin & Cie, 2013).<sup>96</sup>

As noted above, market concentration in the private sector is less applicable to the Philippines. However, with only two public breeding institutions leading the market, decision making power is also concentrated, even if price increase is less of a problem.

For farmer-breeders this mainly means that they have limited political influence in their professional field, via their market power. Educating the public and pointing out the importance of alternative seed systems (for example, for biodiversity and future food security) is a more promising route. Farmer-breeders of MASIPAG and Kultursaat focus their energy on building up an alternative system instead of engaging in a David against Goliath battle with agro-chemical corporations.

We have examined three enclosures of modern seed markets in detail now. It becomes clear that they are cumbersome for farmer-breeders in their professional life. I argue, that in fact, the structures of seed systems are not only important to farmer-breeders economically, but also regarding their well-being.

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95 There are exceptions. Some of the leading organic seed companies are subsidiaries of corporations, for example HILD belongs to Bayer-Monsanto.

96 A partial explanation goes back to the biological enclosures: due to genetic specificities, breeding efforts have different effects on crops. While corn reacts in a highly positive way to hybridisation regarding yield, wheat hybrids have not yet been successfully bred (Mammanna, 2014). Corn is easy to emasculate and cross. Wheat mostly crosses within its own flowers even before they open. That is one reason, why its hybridisation is more difficult.



### *Seeds and well-being*

Looking at the connection between seeds and well-being, two levels can be identified. First, social well-being connected to seeds. For this, extensive literature exists. Second, individual well-being, which is less researched.

Why seeds are important for general human well-being is rather straightforward. Seeds are necessary for food production and people are well when they have access to food. Current and future social well-being regarding food mainly depends on four factors: 1) enough food for the current world population (FAO, 2017; FAO et al., 2017), 2) maintenance of agrobiodiversity for future food security (Cardinale et al., 2012; G. Fischer et al., 2002; GAFF 2016), 3) preservation of cultural heritage (Carolan, 2007; Sievers-Glotzbach et al., 2021; Vivero-Pol et al., 2019), and 4) food choices for different consumer needs (FAO, 2018a). Seeds and agrobiodiversity play a crucial role for these.

Agrobiodiversity is also vital for resilience on a farm level. It helps to sustain yields in marginal farming areas, provide natural disease and pest regulation, as well as pollination, and enhance nutrient and water cycles (Altieri et al., 2015; Cabell & Oelofse, 2012; FAO, 2004; Hajjar et al., 2008; Hooper et al., 2005; Letourneau et al., 2011). This is especially important for subsistence farmers. Furthermore, humanity's responsibility for agrobiodiversity is internationally acknowledged in a number of treaties on seeds and agrobiodiversity (Dedeurwaerdere, 2013; Frison, 2016; Halewood, 2013).

Now let's have a look at the less regarded aspect: how seeds contribute to individual well-being. I argue that the well-being of farmer-breeders is influenced by how the seed systems – more precisely the seed property regimes their seeds are organised in – influence their well-being. No other trade worldwide serves as a source of income for as many people as farming does: there are 2.5 billion small-scale farmers alone, not counting industrial farmers (Holt-Giménez & Altieri, 2013). Those people spend a considerable amount of their time working on their farms. So much, in fact, that the nature and quality of their leisure time activities are also informed by the quality of their main profession (Timmermann & Félix, 2015). Hence the way farmer-breeders work has considerable influence on their overall well-being – and seeds are an integral part of farmers' and breeders' work realities. This assumption is backed by a worldwide farmers' movement towards seed sovereignty.

### *Seed sovereignty movement*

Modern seed systems, as described in this chapter, are highly effective and efficient for one specific form of agriculture: modern industrialised farming.

As mentioned above, not all actors agree with the priorities set to uniformity and yield. Critique against the current system comes from several directions, much of it already mentioned in the text above, such as the concern that shrinking agrobiodiversity, because of modern seed systems, results in threats to the future of food production. As a reaction to these challenges, calls for seed sovereignty become louder (Kloppenborg, 2014; Navdanya, 2012; Saatgut-kampagne, 2008; *Vía Campesina*, 2011).

Seed sovereignty adapts the concept of food sovereignty specifically to seeds. Food sovereignty has itself emerged as a political alternative to food security. As food is often not scarce, but simply too expensive for vulnerable groups to afford, increases in centralised production are not sufficient to tackle hunger and malnutrition. Instead, food sovereignty advocates for the rights of individuals and communities to food and to control their food systems, by ensuring access to productive resources (Edelman, 2014; *Vía Campesina*, 1996; Windfuhr & Jonsen, 2005).

The access of farmers and other producers to seeds, is such an integral part of food sovereignty, that it is described as its own concept: seed sovereignty (Kloppenborg, 2014). Kloppenborg identifies four rights communities need to have seed sovereignty:

1. the right to save and replant seeds,
2. the right to share seeds,
3. the right to use seeds to breed new varieties and
4. the right to participate in shaping policies for seeds and varieties.

Basically, the right of actors to carry on with their inherited farmers' and breeders' privileges. Farmer-breeders want to use varieties of their choice from the pool of existing agrobiodiversity and, in turn, preserve and expand it. This is why in practice, discourses of agrobiodiversity and seed sovereignty frequently mix, as becomes apparent in the next section.

### *Actors of seed sovereignty*

The most notable actors of seed sovereignty are the farmer-associations which have been bringing the concept to life and lobbying for it nationally and internationally. The most prominent examples are *La Vía Campesina* and *Navdanya*, who work on farmer empowerment in Latin America (and now, internationally) and India, respectively. In Europe, the European Campaign for Seed Sovereignty (CSS) does similar work. These associations engage in explicit political work through campaigning, position papers, participation in international conferences and political hearings and so forth.

Another set of actors are local initiatives, who bring seed sovereignty to life by conserving landraces, breeding new open-pollinating varieties, running seed-banks, participating in seed sharing, etc. (Medina, 2011; Pautasso et al., 2013; Sievers-Glotzbach et al., 2020; Thomas et al., 2011). The systems emerging from the local dissemination of these practices, are described as alternative seed systems (see Sievers-Glotzbach et al., 2020 for an overview).

All in all, the goal of actors is less that of overcoming the current seed system, than to make and uphold room for alternative seeds and seed practices in parallel with conventional seeds.

Seed sovereignty is introduced here, because it is a discourse the farmer-breeders of MASIPAG and Kultursaat support. To understand their actions and the normative motives behind them, the desire for seed sovereignty is a valuable backdrop.

The farmer-breeders from my case studies not only engage in seed sovereignty, but do so in a specific form: by creating and maintaining seed commons through seed commoning. The role of collective action (the secret sociological-anthropological word for commons) for seed sovereignty is described in literature (Altieri et al., 2012; de Schutter, 2009; Kloppenburg, 1988; Peschard, 2014; Sievers-Glotzbach et al., 2020). The next chapter gives an overview of seed commons as the central case of my thesis, and their role for food system transformation (including seed sovereignty) and other aspects of individual well-being.

### 3 Conceptual Frame

The three theoretical foundations introduced in the last chapter; well-being, commons and seeds, are integrated in this chapter to form a coherent concept for this research. The aim is to develop a well-being concept for seed commons, which can be operationalised in a way that makes it possible to answer the research question. For this, first seeds (as a specific type of goods) are contextualised within commons. Seed commons are explained in their characteristics and social-normative functions for farmer-breeders globally, the existing literature on seed commons is reviewed and, in a return to chapter 2.2 *An Overview of Commons Theory*, the specifics of seed commons defined as a combination of commons concepts such as knowledge commons, global commons and commoning.

As the concept of seed commons is now familiar, the next step consists of its operationalisation for the study of individual well-being, the aim of this thesis. This is done by modifying an existing well-being framework, Sen's capability approach (which is argued for in chapter 2.1 *On Well-Being*), to seed commons (chapter 3.2 *The Capability Approach for Seed Commons*). For this, the capability approach is first introduced in more detail and conceptual considerations are made regarding how commons are compatible with the approach. As the core of this chapter, finally, a capability list for seed commons is devised and discussed, to be used in the subsequent empirics of this research.

#### 3.1 Seed Commons

The term seed commons describes “common ownership and forms of collective management in plant breeding, seed production, and the usage of seeds and varieties” (Gmeiner et al., 2020, p. 23). This is the case for a diversity of self-organised arrangements around seeds: community seed banks, seed exchange events, farmers' and breeders' associations, but also developers of open (source) seed licences as alternative intellectual property rights options. Many of the examples are listed in the overview of seed sovereignty in the previous

chapter (*Of Seeds and Humans*). They are described as progressive seed commons by Gmeiner et al. (ibid.), as they are protesting the current economic, legal, and biological enclosures around seeds.

Describing them in the material, social and regulative dimensions (see chapter 2.2 *An Overview of Commons Theory*) proves a challenge. **Materially**, seeds are complex goods as they intertwine biophysical (material), genetic (immaterial), knowledge and cultural aspects (Dedeurwaerdere, 2013; Frison, 2018a; Halewood, 2013; Sievers-Glotzbach et al., 2020). All of these facets are deliberately managed as the material dimension of seeds, due to distinct commons concepts fitting them: biophysically, seeds can be managed as traditional commons; genetically, they resemble global (knowledge) commons; culturally and knowledge-wise, they behave like cultural and knowledge commons, respectively (more on that later in this chapter). **Socially**, seed commons can be managed by diverse actors, ranging from small groups to international communities and from peers to partnerships between dissimilar actors. **Regulative**, deliberated practices and norms are specific to the individual seed commons, but all tend to include forms of seed and knowledge sharing, long-term outlook, and redundancy.

#### *Criteria for seed commons*

Four central criteria inherent to seed commons' arrangements are conceptually and empirically identified by Sievers-Glotzbach et al. (2020): (1) collective responsibility, (2) protection from private enclosure, (3) collective, polycentric management, and (4) sharing of formal and practical knowledge. They are developed in a transdisciplinary research approach.<sup>97</sup>

1. **Collective responsibility** translates to an idea of crop plant stewardship. Developed by farmers over centuries, current agrobiodiversity is a central pillar to human food security (see chapter 2.3 *Of Seeds and Humans*) and, once lost, cannot easily be replaced. Seed commoners<sup>98</sup> acknowledge these

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97 The *RightSeeds* project group develops this understanding and conceptualisation of seed commons during their first two project years in close collaboration with their partners in practice, the German organic breeders' association Kultursaat e. V. and the Philippine farmer-network MASIPAG. In a transdisciplinary approach (see chapter 4.1 *Transdisciplinary Research Design*), central terms are jointly defined and discussed as boundary objects, for example an understanding of the term *variety*. From there, the four criteria of seed commons are identified and discussed in an iterative and recursive process (Sievers-Glotzbach et al., 2020).

98 Seed commoners are the people who actively engage in the creation and maintenance of seed commons.

facts and draw from them the responsibility to maintain and promote existing agrobiodiversity. As described above (see chapter 2.3 *Of Seeds and Humans*), this is historically done in-situ, by farmers enhancing landraces on their farms through use, adapting them to their preferences and local conditions, and thereby contributing to crop diversity. For this purpose, farmers need to maintain the right to use, multiply and breed seeds freely. This includes both legal rights to do so and biological reproducibility of seeds. Within seed commons governance, this “has implications for the protection mechanisms, organisational structure and knowledge management” (Sievers-Glotzbach et al., 2020, p. 12).

2. Seed commoners deliberately take measures to **protect their seeds from private enclosure**. This is done by ensuring that actors within and beyond the community can freely use their seed, so no legal or biological restrictions are applied. The logic is that a wide distribution of freely available seeds is the best way to prevent their privatisation, as it is clear that the variety is openly available. Another strand of activists, reason that seeds are best protected from enclosure by applying alternative legal protection, such as open source seed licences (Kloppenburg, 2014; Kotschi & Horneburg, 2018; Montenegro de Wit, 2019). In general, seed commoners are openly critical of enclosing seeds privately and, more widely, protest commodification of nature (Aoki, 1998; Brandl & Schleissing, 2016; Chiarolla, 2008).
3. **Collective, polycentric management** refers to two organisational features of seed commons. First, rules, values and practices within seed commons are deliberated by the group of commoners. Second, decentralised nodes within the polycentric networks keep as much independent decision-making power as possible, while still adhering to the network’s general principles and values. Ostrom describes polycentric structure as governance through formally independent decision-making nodes, which are nonetheless interdependent and organise together on a second level (Ostrom 2010; Ostrom, Tiebout, and Warren 1961). In practice, regionally distributed farms with different organisational structures can adapt varieties independently and then share seeds with each other, which is a common practice in seed commons.
4. Both **formal and practical knowledge are shared** in seed commons. As seeds comprise of both material (seed) and informational (genetic information, seed knowledge) components, organising knowledge transfer is an integral part of their governance as commons. Both practical knowledge, such as breeding and seed multiplication skills, as well as formal knowledge,

such as transparency about the parental lines of varieties, are shared. In this way, farmers' seed sovereignty is enhanced (Sievers-Glotzbach et al., 2021), as farmers keep both access to seeds, as well as the knowledge and skills to use them.

It becomes clear from these four core functions that seed commoners deliberate their arrangements in ways that acknowledge the specific and complex nature of seeds.

### *Norms of seed commons*

Seed commons are structured through normative goals deliberated by the seed commoners themselves, meaning that those values influence practices and organisational structures of the seed commons in question. These normative goals are also identified as social and societal functions by Sievers-Glotzbach et al. (2020). They include general ethical underpinnings of progressive commons, namely social-ecological sustainability, sovereignty and re-democratisation (Gmeiner et al., 2020), but also more specific goals, such as enhancing food and seed sovereignty, empowering farmers, preserving agrobiodiversity, participating politically and working towards a sustainable agriculture (Girard & Frison, 2018; Kloppenburg, 2014; Medina, 2011; Müller, 2012; Pautasso et al., 2013; Shiva et al., 2013; Vivero-Pol, 2017; Vivero-Pol et al., 2019). In contrast to private property seed arrangements, this gives seed commons a more complex and normatively guided set of goals.

Realising these values is also the main contribution to societal well-being described in literature. Individual well-being through seed commons is only touched upon in passing, with mentions of identity (Kloppenburger, 2014) and economic security (Bachmann et al., 2009).

### *Conceptualising seed commons from existing commons' categories*

From a conceptual perspective, seed commons link institutional economic and sociological-anthropological commons' perspectives (Sievers-Glotzbach et al., 2020). Their aforementioned complexity (due to the interlinking of biophysical, informational and cultural aspects) reflects in their commons structure. They combine aspects of traditional, knowledge, global and cultural commons, as well as commoning, and are thus characterised as hybrid commons (Wolter & Sievers-Glotzbach, 2019). This makes seed commons conceptually interesting for commons research. More importantly for this thesis, understanding why seed commons partly function as traditional, knowledge, global and

cultural commons, unveils the underlying reasons which form their criteria, practices, and norms.

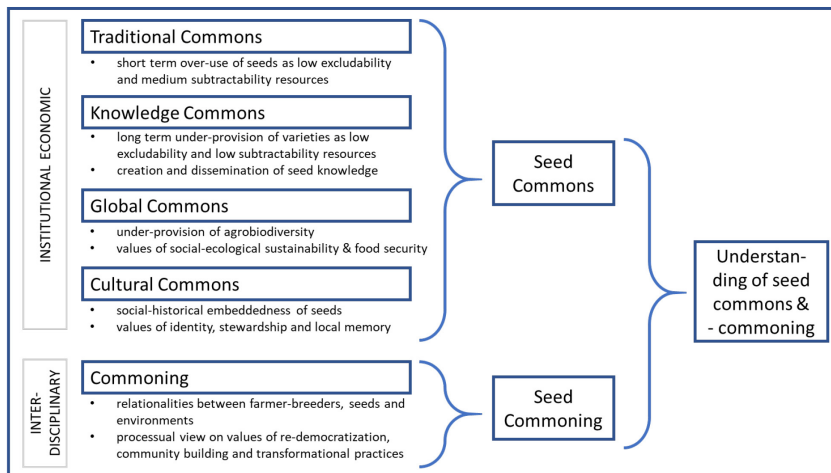


Figure 8: Conception of seed commons and seed commoning in this thesis. Source: Own depiction

Seed commons employ **aspects of traditional commons**. As explained in chapter 2.2 *An Overview of Commons Theory*, traditional commons describe commons arrangements for natural common pool resources with low excludability and high subtractability (E. Ostrom, 1990, 2005). Seeds (material) and varieties (immaterial) need to be viewed separately in this point. Seeds indeed have low excludability, as it is difficult to keep others from obtaining them (especially when selling them as food, but there is also the risk of minor theft from fields; see chapter 2.3 *Of Seeds and Humans*). They are subtractable, but only in the short-term (Sievers-Glotzbach et al., 2020). A community seed bank might hold a finite amount of a specific seed at the beginning of a season, which must be divided amongst its members (subtractable). When that seed is deemed so valuable, that more of it is needed next season, however, it is not difficult to create an abundance of it by the end of the season if every farmer contributes seed back to the seed bank. This is an example of a seed commons practice derived from a traditional commons' characteristic of seeds. Subtractability is only a problem if the community's self-imposed rules fail.

The biological fact that seeds multiply makes short-term seed governance an over-use problem, but long-term seed governance an under-provision problem. Guarding against under-provision is a classical feature of new commons



(Helfrich & Heinrich Böll Stiftung, 2014; Hess, 2008). Seeds already behave peculiarly as natural common pool resources: they can be adequately characterised as such short-term, but behave more like knowledge, and contrary to traditional common pool resources, in the long-term. These longitudinal aspects are therefore better described by the knowledge and global commons characteristics presented below. So, to meet the short-term traditional commons aspect of seeds (low excludability and momentary subtractability), seed commoners devise rules of collective management and responsibility (seed commons criteria 1 and 3) to prevent variety loss (through seed loss of that variety). A norm deriving from this is sharing of seeds whenever possible, to give commoners seed access even in times of shortage and preserve food security. At the same time, rules of distribution are in place, such as how much seed can be taken by whom.

For the genetic, informational aspect of seeds (variety information), the case is different. Due to its knowledge nature, genetic information is non-subtractable (Halewood, 2013). One farmer sowing a variety on their field does not prevent another from using the same. Also, excludability is limited, as acquiring one seed can be enough to obtain genetic information, especially with modern genetic sequencing techniques. Varieties therefore deviate from the economic characterisation of natural common pool resources. They resemble knowledge resources, so the concept of knowledge commons is examined next, to better aid understanding of seed commons.

**Aspects of knowledge commons** are inherent to seeds for two reasons. First because of their variety characteristics (genetic information component) and second because of the knowledge needed to cultivate, multiply, and breed them. Typically for knowledge commons, creation gains importance besides management (Frischmann et al., 2014; Hess & Ostrom, 2007; Sievers-Glotzbach et al., 2020). For the first aspect, the variety characteristics, practices undertaken by seed commoners include breeding new varieties, maintenance breeding of existing varieties (to preserve their characteristics; seed commons criterion 1) and propagating the seeds of varieties to ensure sufficient supply and healthy population size while, enabling the variety's adaptation to changing environmental conditions through continued use and polycentric management (seed commons criterion 3). All of this can be time-intensive, expensive and requires substantial formal and tacit knowledge, depending on the species and rarity of variety. The second knowledge commons aspect is the necessary knowledge to create and maintain seed commons, as well as agrobiodiversity. This information (breeding knowledge, seed saving knowledge and cultural knowledge) is shared amongst seed commons communities and is made partly

transparent to the public (seed commons criterion 4). In summary, knowledge governance, especially creation (of new varieties and seed production) and sharing, are a central structural element in the organisation of seed commons (Sievers-Glotzbach et al., 2021). This is evident in practices of seed and knowledge sharing, as well as variety preservation and links to norms of farmer empowerment, seed sovereignty and agrobiodiversity conservation.

Similarly, seed commons also feature **global commons aspects**. Agrobiodiversity, comprised of the totality of varieties, has been described as a global commons (Dedeurwaerdere, 2013; Halewood, 2013). Agrobiodiversity is essential for human thriving, as it necessarily contributes to secure long-term food supply. It is this aspect of seed commons, where the collective action problem of under-provision is most visible. Seed commoners derive from this a responsibility for humankind to preserve and enhance crop diversity, as well as protect varieties from privatisation (seed commons criteria 1 and 2). Norms of social-ecological sustainability and re-democratisation in seed commons arrangements stem from this rooting in global commons. This is also visible in seed commons practices, which are designed with care of redundancy (failure friendliness), long-term functionality and the possibility of alteration through collective deliberation.

**Cultural commons aspects** of seed commons refer to the intergenerational cultural knowledge and skills of a community (Bowers, 2009; Santagata et al., 2011). They are bound in space and time, meaning that they are specific to local, historical, and social circumstances. This means that they can neither be easily transferred to other places, nor quickly and spontaneously developed as a tool. Cultural commons serve as anchors to identity, sensemaking and environmental interaction. Cultural commons features in seed commons, link closely to aspects of knowledge commons. This is demonstrated, for example, in landraces and heirloom varieties both being locally adapted (space bound) and culturally interwoven (e.g., special varieties for special dishes). Stewardship of seeds is a source of community, pride and purpose (Kloppenborg, 2014). Seed practices which highlight this cultural dimension, include storytelling about them when exchanging knowledge and sharing promising varieties with likeminded farmers, as gifts. These practices back seed commons criteria 1 and 4 (collective responsibility and knowledge sharing). Normatively, the values of farmer empowerment and seed sovereignty support the claim that farmers and seeds should not be separated culturally.

Although seed commons are based in all these forms of commons, only understanding them in this institutional-economic way necessarily falls short of relational and community aspects (see chapter 2.2 *An Overview of Commons*

*Theory*). That is why **seed commoning** is introduced here. The seed commons definition of Sievers-Glotzbach et al. (2021) includes this view, defining seed commons by their social relations and not seeds as goods. Furthermore it draws on Euler's (2018) understanding of commoning as a needs-oriented and self-organised process.

“seed commons are commoning-based arrangements centred on seeds, where a community conducts de facto handling, growing, breeding, and sharing [...] in a needs-oriented and self-organized way” (Sievers-Glotzbach et al., 2021, p. 4).

Seed commoning provides a process view on community seed practices. Referring back to chapter 2.2 *An Overview of Commons Theory*, commoning is conceptualised to include various analytical focal points: relationships performed within commons, commons and commoners co-constituting each other, embeddedness into surrounding social-ecological systems, sensitivity to power relations, a distinct onto-epistemology, shared values, and development of subjectivities.

In private property seed regimes, relationships between actors and towards seeds are highly formalised and compartmentalised into singular areas of expertise. Geneticists, breeders, retailers, farmers – every actor has one specific task. Relationships between actors follow a similarly linear logic, material and information are distributed one-directionally from the academic top to the workforce bottom (vertical relationships).

Seed commoning functions differently: relations are not preconfigured, but deliberated amongst peers in each seed commons, as relations-in-the-making (see Nightingale, 2019). Three kinds of relations are negotiated within seed commons: Relations between commoners as peers; relations to others, including past and future generations; and relations to seeds and agrobiodiversity. Relationships between seed actors are typically horizontal rather than vertical. Hierarchical distribution of tasks is avoided, knowledge is distributed evenly throughout the network and relationships serve a multitude of different support functions. It is here where a different onto-epistemology becomes apparent. Seed commoning reinterprets and re-embeds relations in seed systems. Contrary to private property seed systems, seed commoning works through logics of sharing, cooperation, and reciprocity. Seed commoners use the shared values described above to coordinate their efforts. An example is the simple, aphorismic sentence *seed is sacred* (Sievers-Glotzbach et al., 2021), which determines not only seed sharing practices, but also breeding goals and organisational structures in a specific farmers' network.

The value base of seed commons becomes even more apparent when taking a seed commoning view. Sievers-Glotzbach et al. (2020) write about social functions of autonomy in identifying seed commoning as building community and creating viable alternatives to the private property seed regime. They do so through “social processes of knowledge transmission and social learning” (Sievers-Glotzbach et al., 2020, p. 17). Through this, commoners empower themselves to reclaim seed knowledge and practices. They enhance their self-determination by not being dependent on the industrial seed system, and their food sovereignty, through a choice of adapted seeds and agrobiodiversity. In re-negotiating relations between each other and their surroundings, commoners effectively install democratic participation (Vivero-Pol, 2017). The ethical underpinnings of progressive commons mentioned above, sovereignty and re-democratisation, become visible in these social functions of seed commoning.

Lastly, seed commoning fosters social-ecological transformation in the food system. Food commons have been described as counter-hegemonic movements (Vivero-Pol et al., 2019), which “challenge dominant paradigms of individual property and technological innovation” (Sievers-Glotzbach et al., 2020, p. 17). Seed commoning practices sharing and non-privatisation values and thus provides alternatives to the private property seeds regime paradigms.

Understanding seed commons in terms of their commoning attributes is valuable for understanding their influence on farmer-breeders’ well-being. As noted in chapter 2.1 *On Well-Being*, well-being dimensions include social relations, possibilities for participation, and success in overcoming challenges. All these processes can now be identified within the structure of seed commons, due to the inclusion of seed commoning as a process-oriented, analytical framework.

After these theoretical considerations of seed commons, some examples bring life to their range and functioning.

### *Examples of global and local seed commons*

Seed commons appear in a wide array of forms. The descriptions of seed commons and seed commoning above refer to local and regional seed commons, but there are also global seed commons, such as the International Seed Treaty. I will first discuss global seed commons to explain why they are not relevant to this work.

Global seed commons include international efforts on agrobiodiversity conservation and seed innovation sharing, such as the International Treaty on Plant

Genetic Resources for Food and Agriculture (IT-PGRFA; Dedeurwaerdere, 2012, 2013; Frison, 2016, 2018a; Girard & Frison, 2018; Halewood, 2013; Halewood et al., 2013, 2018; Louafi & Manzella, 2018). Other examples are (national and international) seed banks and their ex-situ conservation (Galluzzi et al., 2016; Tyagi & Agrawal, 2015; Westengen et al., 2018), such as the Global Seed Vault in Svalbard. These global seed commons do not align with the concept of (local) seed commons shared above, because they focus on sharing formalised knowledge and ex-situ conservation (cold storage of seeds, instead of continuous replanting in the field). They are efficient in collecting a wide range of global crop seeds, which makes them useful for academic research and industrialised breeding. They have less value for seed commons because of differing logics, low adaptation to current environmental and local conditions due to storage and a formalised and lengthy access procedure.<sup>99</sup>

Different local seed commons examples are in line with the definition above. One of these is traditional seed systems, where seeds are maintained by communities. They entail seed exchange networks and community seed banks, mostly working with landraces and traditional seeds. In literature, they are noted for contributing to and conserving agrobiodiversity and enhancing resilience for farmers and farming communities (Almekinders et al., 1994; Altieri et al., 2012; Badstue et al., 2006; Coomes et al., 2015; de Schutter, 2009; Pautasso et al., 2013; Peschard, 2014; Thomas et al., 2011).

Recently emerged seed commons arrangements could be called progressive seed commons (see chapter 2.2 *An Overview of Commons Theory*). Their defining feature is that they are anti-enclosure movements of some sort, protesting the biological impediment of reproducibility, as well as economic enclosures, and resisting intellectual property rights on varieties (Aoki, 1998; Brandl & Schleissing, 2016; Chiarolla, 2008; Gelinsky, 2012; P. H. Howard, 2015; Safrin, 2004; Timmermann & Robaey, 2016).<sup>100</sup> Sievers-Glotzbach et al. (2020) also include organic breeding initiatives (e.g., Wirz et al., 2017) as seed commons examples.

Seed commons and seed commoning describe the complex interrelations of seeds (with their material, knowledge, and cultural aspects), seed commoners, their institutional arrangements, and their surroundings. Their coming forth

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99 At least until now – access options by the Seed Treaty can potentially make them more useful for farmers and farmer-breeders (Sievers-Glotzbach et al., 2021).

100 A particular approach against this legal enclosure are Open Source seeds initiatives (Aoki, 2009; Kloppenburg, 2014; Kotschi & Horneburg, 2018; Montenegro de Wit, 2019; Wirz et al., 2017), which use copy-left licenses to ensure the long-term free availability of registered varieties.

through constant practice interweaves them intricately with seed commoners' lives. Hence, they might also be a vital part of their well-being. But how is well-being understood and measured in a way that can unveil the link between seeds and seed commoners' satisfaction? One analytical framework capable of doing so is Amartya Sen's capability approach, which is introduced in chapter 2.1 *On Well-Being*. I will describe it in more detail in the following chapter and explain how I have modelled it to analyse well-being in seed commons.

### **3.2 The Capability Approach for Seed Commons**

It is time to apply a theory of well-being to the research topic of seed commons. In chapter 2.1 *On Well-Being* I have already argued for Sen's capability approach as my theory of choice, because it fits my criteria in its eudaimonic view of well-being, its combination of objective reasoning with subjective empirics, its applicability to individuals, and a flexible understanding of preferences. The capability approach takes individual motives and aspirations into account but at the same time considers what should be valuable for people as beings embedded in societies and ecosystems. It tries to conceptualise human well-being to a high degree of complexity and goes further than standard economic assessment of aggregated preferences. This will automatically pose challenges to measurement.

Therefore, this chapter first explains the capability approach in more detail, then discusses how commons can be incorporated into it, as property regimes have played no role in capability studies so far. It then explains a few challenges when applying the approach to a new field of study, and how I choose to overcome them for this work. Finally, capabilities are selected for seed commons, and the transdisciplinary process is discussed, and the list is validated before its use in my qualitative interviews.

#### *Sen's capability approach to human well-being*

The capability approach looks at actors' opportunities for action, *capabilities*. Capabilities range from basic, like having the ability to get sufficient nutrition or having access to safe housing, to complex, e.g., the ability to engage in social life or the ability to pursue one's dreams (see Sen, 1992). A set of capabilities is unique for every person and in constant flux, determined by his or her personal resources, social context, and access to (non-)material means (I explain this in more detail below). The individual decides which capabilities they regard as valuable to achieve their distinct understanding of well-being. The capabilities individuals decide to categorise into "beings and doings"

(Sen, 1992) are called *functionings*. When applying the capability approach, the opportunities of every person to realise their well-being are evaluated. This is done by looking at the quantity of capabilities the actor has both access to and reason to value.

Amartya Sen first outlined the capability approach about 40 years ago in his lecture *Equality of what?* (1980a). It is gradually developed further, first mainly by Sen himself (1984, 1985, 1992, 1993) and later also prominently by Martha Nussbaum (1988, 2000, 2002, 2003).

Sen creates the capability framework to pose an alternative to the existing, economically focused measures of human well-being. The approach criticises standard economic well-being and development theories, which have an underdeveloped understanding of human agency (the following argumentation can be found in more detail in chapter 2.1 *On Well-Being*). First, these theories break agency down to one single motive, e.g., self-interest or desire fulfilment. Consequently, those theories focus on only one, or a few quantifiable factors for assessment, like utility (on the theoretical level) or GDP<sup>101</sup> (on an empirical level). Second, it is assumed that this motive holds true across all societies. Standard approaches leave little room for individual or culturally adapted understandings of well-being. More often than not they aim at copying and pasting a western industrial lifestyle, while well-being could have many more faces (see Acosta, 2017). Third, even on an individual level, reality is more multifarious. People are driven by various motives, not only self-interest and spontaneous desires. Social ties, aspirations of self-fulfilment and altruism are just as determinant in motivating human striving. Standard well-being approaches fail to grasp this complexity. Therefore, in contrast to other theoretical approaches of welfare economics, like utilitarianism (Bentham 1789; Mill 1859) or distributive justice (Rawls 1971), the capability framework measures functioning or capabilities directly and adapts them to the individual or community it strives to understand, instead of opting for the next-best variable like utility or income.

What exactly constitutes well-being is not specified within the concept but is matched with the individual vision of each person. There are valuable beings and doings for people to achieve – what these are, is not fixed. The approach claims, however, that to live a full life, not only must an individual's physical needs be met, but they must be given the opportunity to develop and pursue

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101 Even on the well-being level of states, narrowing the assessment of economic health for countries solely on GDP and equalising it with a measure of that country's societal well-being has been shown to be both a misunderstanding and inadequate (Parrique, 2020).

their own aspirations. A good society then is not one where every person has the same assets, but one that gives every person similar chances of developing their capabilities according to personal choice. This statement might seem contradictory at first but can be easily explained with the help of an example: Two people both live in villages five miles from the next city, but one in the north, with a direct street leading to the city and the other in the south, where a broad river flows between their village and the city. If both are now given the same asset, a bicycle, to achieve the capability of personal mobility into the city, only the person in the northern village will effectively gain that capability. The person in the southern village would need two assets to achieve the same capability status: a bicycle and a boat to cross the river. In this case, they hold the same assets, yet still have different chances.

If and how every person can acquire capabilities depends on various conversion factors, which describe the person's unique circumstances, as depicted by Robeyns (2004, see Figure 9 below). Which means (personal, social or material) a person can individually turn into which capabilities is determined by social context (e.g., social institutions, including rights, laws, and norms but also environmental factors; upper left in the figure), the means a person can command (e.g. market and non-market production and net income; lower left in the figure), and his or her individual characteristics (e.g. gender, physical and psychological ability, age; influenced by social context).<sup>102</sup> From the interplay of these three factors, the person is now equipped with their own set of capabilities. In a next step, they can choose if, and which of their capabilities they want to manifest as functionings. The choice, again, is moderated by socially informed preference formation (upper middle in the figure) and personal history and psychology.

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102 Although quite comprehensive, Kleine (2013) identifies shortcomings in the framework's conceptualisation. While some elements which determine if an actor turns or can turn the various capabilities he or she possesses into actual functionings, are accounted for, she argues that even more factors come into play. Her choice framework specifies several factors mentioned by Robeyns (2004), such as personal history and psychology and social influences on decision making. The biggest advancement, however, is the addition of degrees of empowerment. This element repeals the simplistic assumption that actors know about all capabilities that would be achievable for them and are always successful in achieving a function they choose to develop. Instead, it distinguishes between four stages of empowerment, all influenced by the actor's agency as well as the outward structure: the existence of choice, a sense of choice (whether the actor knows about his or her choice), the actual use of choice and the achievement of the desired outcome of that choice.



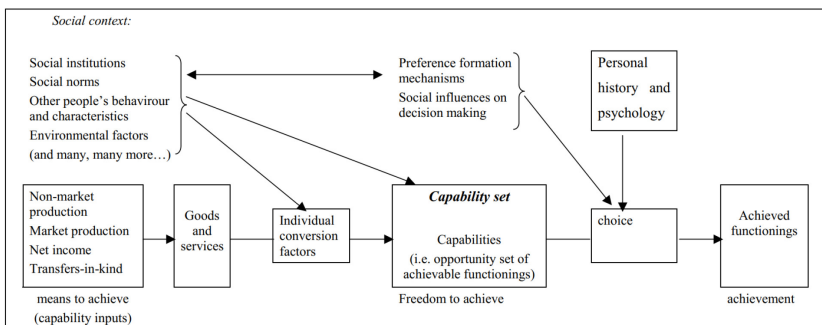


Figure 9: Influencing factors for a person's capabilities and achievement of functionings. Source: Robeyns 2004

Let's look at an example, starting from the left side of the figure above, we start with a market produced or transfer-in-kind material good, in this case, a bicycle. A healthy person who knows how to ride a bike and lives in a place with suitable streets or paths, gains the capability of mobility. That person can then ride the bike if they wish and if social influence and personal history allow them to, and achieve the functioning of mobility. The manifold conditions I have deliberately written down in the last two sentences foreshadow the many obstacles which may keep a person from achieving that functioning, although they would like to do so. Individual conversion factors might inhibit it: Not knowing how to ride a bike, not being able-bodied, being sick or weak, or the bike just being too big for the person. Social context might be unfavourable: Social institutions promoting cars and reckless driving, making it too dangerous to ride a bike through traffic, social norms frowning upon women riding bikes in the first place, or unsuitable environmental factors, like living in an extremely mountainous area or a river delta, where mobility is better achieved by walking or boats. If all that is not the case and the person has the capability to ride the bike, they might still choose not to do so, although they would like to. Social influence could be a factor, such as finding it too dangerous to ride a bike or having several young children to attend to, all of whom cannot fit onto the bike at once. Preference formation might also compel the person to keep using public transport, because all their friends do so, and it is pleasant to have a chat on the way. Personal history might involve a previous bike accident, leaving the person scared of riding again. All in all, a lot of factors need to align for goods to be turned into capabilities and functionings for individuals.

The capabilities and functionings described until now are all beings and doings. What interests me in this thesis are common property regimes (institutions), though. The next few pages show how commons can be placed within the capability approach and argue that it makes sense to use this approach to research their importance for people's well-being.

### *Commons in the capability approach*

From a historic-economic viewpoint, property regimes have always been viewed as instrumental to individual and social well-being. Consequently, it makes sense to operationalise a well-being theory (the capability approach, in this case) to evaluate if commons (as a form of property regime) can hold true to this expectation.

From a capability approach viewpoint, however, property regimes are largely dismissed as irrelevant. In Robeyns' depiction of the framework (see *Figure 9* above), property manifests in *goods and services*. This element is particularly discussed in literature. Goods and services have no intrinsic worth in the capability approach. Their value stems from the opportunity to use them as instruments to further actors' agency (Nussbaum, 2006). They are understood to merely be a means to an end i.e., to attain individual well-being (used to further capabilities and realise functionings), not ends in themselves. That is why looking at the influence of goods on human well-being using the capability approach, is not commonly done. This approach was primarily designed to look at the bigger picture: poverty, inequality and hunger are some of the more common topics of investigation.

While Sen and Drèze (1998, 2002) attempt to give services a more central role in their survey, by looking closely at education and health services, Kleine (2013) genuinely develops her research around a combination of goods and services. She enquires about the influence of information and communication technologies (ICT) on deprived rural actors in Chile. Her study hints at the property *regimes* behind these goods and services, by including descriptions of new social relations establishing in internet cafés and libraries which offer web access for private purposes. From an institutional lens, the research does not strictly stop at the (im-)material influences of property. It includes social and regulative dimensions, even if implicitly.

To my knowledge, nothing is explicitly said about property regimes in capability literature. As institutions they are socially designed. From the perspective of the capability approach it is desirable to design them in ways that enhance capability options for actors, and to critically assess if and how they do. This

is what this thesis does for seed commons. The focus does not lie on seeds themselves (*goods and services* in Figure 10), but seed commons as property regimes which surround them. Hence it reaches wider than Nussbaum's understanding of mere instrumentality of goods and critically questions her dismissal of goods and services as solely material and negligible artefacts for human well-being. On the contrary, this thesis enquires into the multiple layers of influence property regimes have on actors' well-being, if comprehensively identified within the capability approach (see Figure 10).

A recap of the understanding of commons in this thesis: As explained in chapter 2.2 *An Overview of Commons Theory*, this describes the complex interrelations of (im)material resources, communities of commoners and the rules deliberated to govern them. Commons are types of property regimes. As such, they go further than looking at resources (material instruments for human action). Rather, they consider social ties and interconnections amongst the commons community (social), as well as deliberated rules of resource use, (re)production and sharing (regulative). Through knowledge and global commons aspects, commons acknowledge informational and ethical aspects of the resource. From sociological-anthropological commons studies comes an awareness of power relations within the community and from outside actors, as well as the recognition of symbolic capital motives (e.g., status that comes with taking part in the resource's organisation). And finally, commoning points out possible wider implications for current societies through reshaping relations and meaning-making.

Therefore, their influence on individuals within the capability framework is also multifaceted. Distilling the commons aspects which should be in the capability framework, to assess the relationship between commons and well-being leads to four main points, which need to be included in the framework. First, **resource characteristics** that change depending on the property regime they are organised in<sup>103</sup>. Second, **practices** promoted through the property regime. Third, **(power) relations** formed and reshaped (I) between actors within the property regime, (II) between actors and surrounding social systems

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103 This includes excludability and rivalry. While seeds in private property regimes are artificially made excludable and rival by preventing reproduction legally and biologically (see chapters *An Overview of Commons Theory* and *Of Seeds and Humans*), seed commons follow the contrary logic and decrease excludability, while organising in ways that rivalry is lessened. For rivalry, for example, this happens in community seed banks with rules to give more seed back at the end of each season than are taken at its beginning (in more depth in chapter 3.1 *Seed Commons*). Regarding excludability, seed commons structures make sure to prevent legal enclosure through keeping community seed registers or waiving legal private property seed protection.

through the property regime and (III) between actors, the resource itself and the environment through the property regime. And fourth, **values** deliberated and promoted through the property regime.

After all this pre-configurative work, Figure 10 now points out where common property regimes and commoning are set within the capability approach.

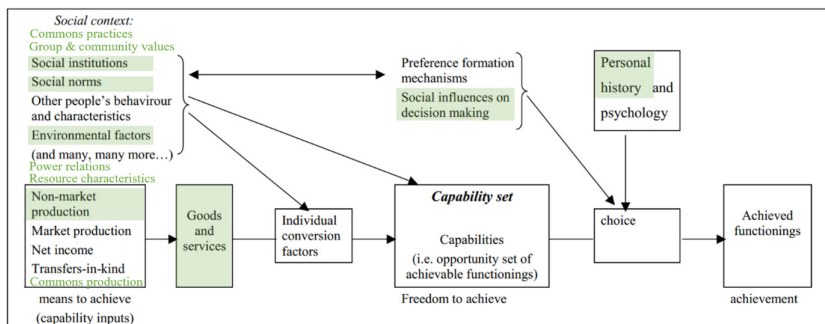


Figure 10: Locating commons in the capability approach. Source: Adaption of Robeyns 2004

For a start, in the *means to achieve*, the material resource and its characteristics constitute *goods and services* within the scheme. For commons, they most likely come from what is called *non-market production* here. There should be another category, *commons production*, to be more precise and to acknowledge the existence of common property regimes.<sup>104</sup> However, this is rather a semantic finesse, as the form of production does not directly influence capabilities, except through the goods and services they provide. What the mode of production might influence are the characteristics of the goods and services. I add *resource characteristics* in between the *means to achieve* and *social context* in the figure, as especially for commons resource characteristics, they encompass both material and social elements.

Property regimes shape *social context*. Because participation in common property regimes is comparatively time-intensive, happens in groups and requires practical concerted action, they might determine the social context of individuals more than other property regimes. They are themselves central *social institutions* which actors are confronted with. As such they play a role in structuring the life realities of actors. Maybe even more importantly: in accessing certain goods and services through commons, actors engage less with other

104 Private property is regarded in *market production*, state property can be found in *transfers-in-kind*. No-property and commons are mixed together in *non-market production*.

institutions, such as private property regimes or state welfare. They may, however, become actively involved in local political institutions. It is fair to assume that the involvement with commons changes the social institutional setup of actors. Commons also play their part in providing *social norms* through the *group and community values* and *commons practices*, mentioned in the description above. Even if actors satisfy most of their needs for instrumental goods from market provision (private property) and only participate in commons for a few goods and services, they gain a set of distinct logics and values which at least partially counter their otherwise prevailing beliefs. Depending on the specific commons, they may also influence *environmental factors* surrounding actors. They shape ecosystems, for example, if the commons are natural common pool resources, or strive to preserve the environment in general, as is the case for global commons. Lastly, not mentioned in the original depiction, commons provoke shifts in *power relations*. They usually strive for non-hierarchical organisation and foster actors' autonomy. At the same time, studies in feminist literature critically remark that women might actually suffer from less time-autonomy when participating in commons, as they require more active work than other property regimes, and prevailing gender roles are not challenged within them (Leder et al., 2019; Tummers & MacGregor, 2019).

All these social context factors together indirectly influence *individual conversion factors*, as well as the *capability set*. They play a more direct role in *social influences on decision making*. For the set of capabilities concerned with the common property regime, the group of commoners comprise a vital peer group. Their shared values and practices are active factors influencing *choice*.

Finally, participating in the organisation of a commons, shapes parts of *personal history*. As substantial amounts of time are spent engaging in commoning, personal experiences are formed which influence *choice*.

Common property regimes are hence present in various aspects of the capability framework, reaching beyond mere *goods and services*. They should not be dismissed as instrumental for human well-being but taken seriously as influencing factors. To empirically test how exactly commons influence actors' well-being, the capability approach is operationalised for specific application to seed commons in the following step.

#### *Applying the capability approach: challenges and open questions*

In order to leave room for individual concepts of well-being, as well as an adaptation to each specific context, the capability approach is intentionally left in a preliminary state. Robeyns describes it as an “evaluative framework” (2017,

p. 37), instead of a fully specified theory. The approach is often praised for its individual outlook on well-being and therefore its strengths and novel insights into development theory. At the same time, it is criticised for almost the exact same reasons (Evans, 2002; Stewart & Deneulin, 2002; Stewart, 2005).<sup>105</sup> In practice that means that the approach needs several additional specifications before research can start.

Two of them, normative grounding, and practical challenges, specify the ethical frame of the research. As this preliminary step is not commonly elaborated in literature, I have included its process and details in *Appendix E: Normative and Practical Specifications of the Capability Approach Prior to Application*, for the interested reader. This is a brief summary.

The normative grounding explains which capabilities are regarded to be valuable in this research and provide an ethical compass against which to test suggested capabilities. It is mainly meant to prevent discriminating capabilities.<sup>106</sup> Sen (1993) suggests establishing a normative base specifically for the application context. To do this, I collect and critically reflect values which are present in the seed commons discourse, with special focus on commons qualities. For seed commons, values include food and economic security, ecological sustainability, food sovereignty and re-democratisation of the agricultural system. For commons values I lean on the previous work of Gmeiner et al. (2020), which identifies sovereignty, re-democratisation and social-ecological sustainability as core values of progressive commons (to which the seed commons case studies presented in this thesis contribute). As these three values include the values of alternative seed systems listed above, they are used as the normative base here.

As a normative base of property regimes, things need to be organised in such a way that they are comprehensively open to satisfy actors' needs for well-being, not fixed on the narrow functions they were designed for, specifically, by enabling the creative attainment of three values important for the future of humanity: sovereignty, re-democratisation and socio-ecological sustainability.

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105 That makes the capability approach flexible in its application. It is adapted for a wide variety of disciplines and contexts (see Robeyns, 2003): It has interdisciplinary applications in economics, sociology and political sciences and is applied theoretically as well as empirically. It is even used by practical actors directly, such as NGOs and interest groups. Also see chapter 2.1 *On Well-Being*.

106 Such as “the ability to live without foreign neighbours”; further explanations in *Appendix E: Normative and Practical Specifications of the Capability Approach Prior to Application*.

Practical challenges to modelling the approach to a specific topic, arise from the inclusion of practitioners in the development of a capability list. Although they are the recognised experts on the topic, they are also ingrained in logics and cultures which might contain path dependencies. This can lead to problems of choice, where options are perceived as restricted or limited where they are not, or actors have learned to be content with fewer options than they could have.<sup>107</sup> When developing a capability list together with practitioners (trans-disciplinarity), as is done here, these possible restrictions need to be kept in mind.

The brunt of preliminary work is devising a suitable capability list for the topic in question, in this case seed commons. Sen describes that there are valuable beings and doings for people to achieve – however, these are not fixed. In the next step, the capability approach is modelled and operationalised to enable understanding of the influence of seed commons (as a form of property regime) on farmer-breeders’ individual well-being. Robeyns (2003) has developed a guideline describing how to specify the approach, which I follow here.

*Selecting which capabilities are important – Developing a capability list for seed commons*

For each new application of the capability approach, a capability list needs to be developed (Sen, 1993). If Sen’s belief in social choice (1995, 1999) is taken seriously, that proves to be a complex task. He calls for a democratic process of selecting relevant capabilities for each research topic but does not detail it any further. To overcome this hurdle to applying the approach, Robeyns (2003, 2017) suggests an appropriate step-by-step procedure. It starts with an open brainstorming of possible capabilities, using all information the researcher has already gathered on their research subject. The resulting list is then recursively refined by engaging it with (1) existing literature, (2) the research participants in a democratic procedure and (3) peer scholars in scientific discourse.<sup>108</sup>

A specifically designed list is not only capable of describing relevant aspects of the existing case, which a broader list might miss, it also provides the opportunity to focus on problem areas in the research field. In her own work on gender inequality, for example, Robeyns (2003) develops a list of capabilities which

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107 For example, women could report to not need access to grain seeds, as that traditionally is their husband’s domain.

108 Robeyns makes clear that it is not necessary to firmly follow those steps, but rather to keep the deliberative, procedural, and recursive character in mind as the central idea for the design process.

are adapted to catch nuances in time autonomy and social interrelatedness – specific and urgent challenges for women. Similarly, Kleine (2013) focuses on empowerment and possible restrictions to choice, for her research on information technology as a means to personal development in Chile.

Robeyns' suggests five criteria for the selection of capabilities (2003, p. 70 f.): (1) explicit formulation, (2) methodological justification, (3) sensitivity to context, (4) different levels of generality, and (5) exhaustion and non-reduction. Capabilities need to be described explicitly enough to be understandable to actors and not leave too much room for interpretation. This includes using understandable language (1). The method used to form these capabilities needs to be clear and argued for, which is what I do in this chapter (2). Capabilities are embedded in socio-cultural contexts. These must be considered if the capability list is to be relevant. In my case, two cultural contexts of Filipino small-scale farmers and German organic breeders are especially defining (3). The fourth criterion suggests first developing an ideal list and, from that basis, deriving a separate list for empirical analysis, to account for problems of data availability, measurement tools and other restrictions. This is particularly necessary for quantitative work. As the field work of this research is conducted qualitatively, the criterion of different generality levels is less relevant (4). Finally, all capabilities relevant to the context are described, and they should be formulated as precisely as possible to delineate them from the other capabilities (5).

Linked closely to Robeyns' suggestions, only varying slightly in the order of conduct, I derive my list by going through the following steps:

1. Specifying a normative base theory for capabilities derived from seed commons (see above and *Appendix E: Normative and Practical Specifications of the Capability Approach Prior to Application*).
2. Selecting which capabilities are important for evaluating the influence of seed commons on actor's well-being, whilst keeping Robeyns' five criteria for capability selection in mind. This happens in four steps:

**Step 1:** Getting to know the theoretical and practical field of seeds by reviewing the literature and engaging with practitioners, namely breeders, farmers and network coordinators. Then brainstorming essential aspects to include from these impressions, to develop a concept of which capabilities are necessary for seed commons.

**Step 2:** Engaging these essential aspects and first capability ideas with existing capability lists to decide which capabilities are fruitful for an assessment of seeds. Conceiving a first draft for a capability list from this step.



**Step 3:** Discussing this draft list with expert practitioners in the field. Altering the list critically (to avoid falling for their possibly politically shaped opinions or adaptive preferences, see *Appendix E: Normative and Practical Specifications of the Capability Approach Prior to Application*) according to their critique and comments.

**Step 4:** Discussing the revised list with the scientific community familiar with seeds, commons or the capability approach and making final adjustments to the list.

3. Specify whether the empirical analysis will look at functionings and/or capabilities.
4. Decide if and how to weight the individual functionings and/or capabilities (also see Sen, 1993, p. 32).

As the normative grounding (1<sup>st</sup> in the list) is already constructed in the previous paragraphs, the next paragraphs show how the capability list for seed commons, my key piece of capability approach operationalisation, is developed.

In the **first step**, I review literature on seed commons, seed practices and alternative seed systems globally.<sup>109</sup> Many of them also inform Chapter 2.3 *Of Seeds and Humans*, above. All reviewed papers used in the description of the capability list below, are cited there, so I do not list them here. With this knowledge, I select the first intuitive possible capabilities for seed commons.

The resulting list of capabilities for seed commons is both descriptive and normative. It is normative in the sense that it suggests which capabilities are more likely to promote actors' well-being. However, I keep in mind that different seed systems might lead to different capabilities in different socio-cultural contexts. Part of the empirical work of this thesis is to let actors decide which capabilities they find most valuable.

In the **second step** I start by comparing existing capability and well-being lists (they are closely related in practice) by Nussbaum (1995, 2000, 2003), Robeyns (2003) and Grisez et al. (1987).<sup>110</sup> These are general capabilities, so I adapt

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109 The sources I use to describe seed practices are skewed in the direction of commons-based seed organisation. This bias is hardly avoidable in that the scientific literature dealing with private property seed systems is seldom concerned with non-economic capabilities (most of them focusing on yield and ROI), which makes them unfit to inform my project. The commons literature is more encompassing, which may have to do with the fact that commons-based seed practices occur in cases where actors feel disempowered by the prevailing private property seed systems and then reflect more earnestly on a broader variety of capabilities.

110 The Swedish approach to welfare (Erikson, 1993) and the work of Alkire and Black (1997) are also considered but not used. Most of the aspects mentioned in these lists are either too

them for the specific focus on seed practices. The listed capabilities should be relevant to the topic and distinct, however, some overlap between them cannot be avoided.

Each list has specific emphasis and aims. Nussbaum's list is an attempt at an objective capability list for well-being applicable to all human beings worldwide. She models it as a guiding tool for policy recommendations. As the most general existing list, I use it to make sure I think of all the possible relevant areas of capabilities for seeds. Robeyns' list is a detailed example of capabilities applied to gender inequality. Her list and recommendations are especially valuable as an example of how to adapt capability lists to certain topics. The list of Grisez et al. (1987) gives additional food for thought, as it is designed differently to the other lists. It is not concerned with capabilities, but with the most basic motives of human action, and its approach is from a more abstract and ontological standpoint. This rather philosophical lens helps to reflect on the fundamental aspects of being human and how seed practices might further, or stall farmers' and breeders' progress towards well-being.

Robeyns (2003, p. 75) notes that most lists share the same underlying dimensions of life, physical and mental health, knowledge and education, work, play and leisure, and social relations, including family, friendship and further affiliations. With these general categories in mind, together with the lists mentioned above and the seed background knowledge of step 1, I initially decide for ten capabilities that I deem relevant to seed practices. Capabilities are intentionally broad at this stage to give seed actors and scholars, with whom I discuss the list in subsequent steps, the widest range of topics possible to agree with, alter or assess as irrelevant and discardable. Some capabilities may seem slightly far-fetched at this stage (such as being capable of time autonomy through seed use or finding spiritual connections with seeds and plants). However, they are narrowed down in the subsequent dialogues.

After these theoretical steps, practical discussion of the initial list with seed practitioners follows as a **third step**. I do this with (1) a coordinator at Navdanya, a well-established Indian seed and farmers association, (2) a breeder at a conventional European seed company, (3) the managing director of my case study Kultursaat e. V.<sup>111</sup> and (4) the sales manager of a German organic seeds company.

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specific to another context (e.g., Swedish welfare) or already sufficiently included in the three main lists I regard.

111 This person manages the day-to-day operational business of the organisation and is not a breeder themselves. They are also not interviewed for my empirical research later, which is

They are asked in detail about all capabilities. In particular, a) if they fit the seed practices of the farmers and breeders they work with, b) if capabilities are missing from the list or aspects are missing from the capabilities described, and c) if capabilities are superfluous or irrelevant and should be taken out. This narrows down the list<sup>112</sup> and refines several of the capabilities.

In the **fourth step**, I review and discuss the list with the scientific community. The list is sent to scholars via e-mail with a request for comments. Five researchers comment: 1) a US sociologist and anthropologist focused on seed systems, 2) a Belgian legal scholar focused on seed and variety law, 3) a German agriculturalist focused on organic seed production, 4) a French sustainability economist focused on alternative economic systems, and 5) a German philosopher, who focuses his comments on the process of list development.

According to Robeyns, after selecting and discussing capabilities, it should be specified if the empirical analysis will look at functionings and/or capabilities (which is 3 in the selection process above). Speaking to the practitioners and seed scholars, I set the focus on capabilities. Interviewees repeatedly ground their own motivations or the ones they observe from their research subjects in sustainable seed practices which remain possible long-term (capabilities), even if not used by actors (yet; that would be the matching functionings). For example, the legal possibility of using varieties as parent varieties for own breeding projects, or the biological possibility of seed saving, even if farmers still decide to buy novel seeds regularly.

Finally, the 4<sup>th</sup> aspect of Robeyns' capability list set up is to decide if and how to weight the individual capabilities. As my research is exploratory, I waive this step. The research aim is not to give a final assessment of how high actors' well-being is influenced through seed commons, but to establish if it is probable that seed commons and their practices have such an influence at all. To find out the latter, weighting of the capabilities is not necessary.

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why I include them in this initial step without doubling their opinion in my research. The coordinator interviews of my other case studies, MASIPAG, on the other hand, are included in the empirics subsequently, but not here. Ideally, a MASIPAG coordinator should be included here. However, I make the decision not to, as a remote interview to the Philippines for this part of research proves difficult, because of internet connection issues, a language barrier and too little upfront knowledge about MASIPAG's organisational structure. Therefore, all interviews with Filipino actors are conducted in person in the research stay on the Philippines later in my research.

- 112 The capability of "leisure time" is taken out as all interviewees report it is not relevant for the context. Also, the two capabilities of "excellence in work and play" and "sense, imagination and reasoning" are taken together into one capability ("some degree of excellence in work and play through sense, imagination and reasoning").

### *The capability list for seed commons*

After going through all four steps, the capability list for seed commons is set. I describe each capability in three paragraphs: general description, relevance for seeds, and specific impacts on farmer-breeders.

#### **I. Life, physical health, and adequate nutrition**

This first capability describes the ability to be physically healthy and enjoy a life of normal length (Robeyns, 2003). This means preserving bodily integrity and safety, the ability to live in a safe and pleasant environment and having access to food sufficient in quantity and quality (ibid.).

A healthy life is the most basic human need. Seeds may be directly linked to this capability as they can be consumed by farmer-breeders themselves or provide the fruits and plants which are grown from them. For subsistence farmer-breeders, whose main sustenance is their own produce, practical and nutritional aspects need to be considered. Varieties need to have comprehensive nutritional abilities (Altieri et al., 2012; Borlaug, 2000; Bouis, 2002; Osman & Chable, 2009; Pautasso et al., 2013) and be suitable for specialised farming practices (e.g., intercropping, agroforests or Milpa) to offer yield security (Altieri et al., 2012). For this to work, seeds must be adapted to farmer-breeders' needs through various characteristics: environmental adaptation, suitability for multi-use, storage ability, time of harvest and distinct processing qualities. In short, the extent to which certain seeds ensure food security and adequate nutrition are vital for this capability (Christinck & Weltzien, 2013).

Even for cash-crops, however, the type of seeds farmer-breeders work with are linked to their health. For example, high yielding varieties are more likely to need optimal growing conditions, which translates to fertilizer and pesticide application (Batt & Rexha, 1999; Mundlak et al., 2004; Wilson & Tisdell, 2001; Chalermphol et al., 2014). The use of agrochemicals negatively impacts farmer-breeders' health, especially in developing countries. Looking at pesticides in Sri Lanka, Wilson and Tisdell (2001) find that farmers in less affluent settings often forego precautionary measures when employing pesticides. They might use more harmful, sometimes outdated substances, and apply them too often or in adverse weather conditions. They do so to cut costs, because they lack information, or in response to plant stressors such as insects. Farmer-breeders in more affluent settings face health risks through agrochemical use as well. Parkinson's disease is shown to be a possible late sequela of the use of certain pesticides (Pouchieu et al., 2018), which prompts French authorities to classify it as an occupation disease for farmers. In general, there is a vast body

of literature pointing to problems caused by agrochemical use for both humans and nature (Borlaug, 2000; Lammerts van Bueren et al., 2011; Tester & Langridge, 2010).

## II. Mental well-being and inner peace

Complementary to physical well-being (capability I), this capability describes psychological well-being, including mental health (Robeyns, 2003), inner peace and absence of conflicting feelings (Grisez et al., 1987), as well as identity and self-worth.

Farmer-breeders may feel pride, satisfaction and identity in cultivating certain local varieties (Osman & Chable, 2009; Pautasso et al., 2013), protecting a valuable cultural heritage (Montenegro de Wit, 2019; Osman & Chable, 2009), or just providing food for others (Dedeurwaerdere, 2012).

Yet, seed use can also be a source of both economic and ecological anxiety. The following capability focuses on economic anxiety and questions of control over individuals' economic futures. This uncertainty is most salient for farmers (less so breeders) for at least three reasons: (1) considerable cost of agrochemicals<sup>113</sup>, (2) increasing climate instability (IPCC et al., 2014) and resulting higher pressure from pests (Gregory et al., 2009), as well as (3) fluctuation of agricultural commodity prices (Gouel, 2012; Huka et al., 2014; Kasem & Thapa, 2012; Mitra & Boussard, 2012; Shee & Turvey, 2012). Taken together, this forms a constraining and unstable economic environment for farmer-breeders, both in settings of scarcity (Almekinders & Louwaars, 2002; Altieri et al., 2012; Batt & Rexha, 1999) and affluence (Hampicke, 2006). The fear of yield loss and financial deficit, potentially leading to bankruptcy, makes farmer-breeders anxious about the performance of their seeds. It raises vital questions about the sustenance of their livelihood and that of their families.

The situation is worsened by a growing imbalance of power between seed and agrochemical companies, and farmer-breeders (Batt & Rexha, 1999; Borlaug, 2000; Montenegro de Wit, 2019; Osman & Chable, 2009). These companies now possess unbalanced economic and political power compared to other

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113 The cost for seeds and agrochemicals varies widely for region, crop, and crop cycle, but always comprises a substantial percentage of total farm costs. Seeds account for up to 30 % of costs, especially in commercial high-input farming. Agrochemical investment, directly connected to seed choice (see chapter 2.3 *Of Seeds and Humans*), varies substantially, from about 5 to 45 %. These findings seem rather consistent for countries globally and for commercial and subsistence farmers, with the exception of no costs for saved seeds for the latter (Abdulaleem et al., 2017; Arnott et al., 2018; Kibirige et al., 2014; Plastina, 2018; Wesseler et al., 2015).

relevant actors in farming systems (P. H. Howard, 2009, 2016). Farmer-breeders might either be in favour of technically advanced seeds the companies are able to provide, or fear becoming dependent on fewer companies. For breeding, these trends translate into the fear of losing (access to) plant genetic material necessary for breeding (see capability III).

However, informal seed systems also cause worry if they provide uncertain seed quality due to suboptimal regulation and lack of third-party quality control. Research regarding the prerequisites of high-quality seed supply show that they are difficult to meet (Delouche, 1968; Delouche et al., 1973) in humid, arid (see also Alqudah et al., 2011), and pest prone conditions.

Another form of anxiety is ecological and relates to genetic erosion and agrobiodiversity loss caused by seed-related pesticide use. Agrobiodiversity is considered to be the insurance for future human food production (Barbieri & Bocchi, 2015; Montenegro de Wit, 2019). Ecological problems also stem from seed-related pesticide use (as described in capability I): agrochemicals impact soil bacteria, freshwater, and biodiversity of non-agricultural species (Feld et al., 2015; Lautenbach et al., 2012; Potts et al., 2016; Yadav, 2010).

For organic farmer-breeders, a lack of suitable seeds is an additional source of worry. As organic agriculture refrains from use of chemical inputs, it requires well-developed organic varieties (Pautasso et al., 2013), which are more resistant to biotic stresses and grow well with fewer nutrients. These demands must be adequately considered in today's modern breeding. Moreover, many of the techniques used in modern plant breeding are not in accordance with organic farming principles (Osman & Chable, 2009). For specific crops such as cauliflower, there are simply no seeds that fit organic criteria, forcing farmer-breeders to act against their moral principles and use hybrid varieties.

### **III. Economic security**

This third capability is concerned with economic security, which requires sufficient means of production in the form of property or ensured access rights “on an equal basis with others” (adapted from Nussbaum, 2003), which can be used autonomously by farmer-breeders. This is referred to as “food sovereignty” (Jarosz, 2014; Windfuhr & Jonsen, 2005).

Seeds are a crucial factor in production. While full-time breeders working for seed companies enjoy stable employment and financial conditions, for farmer-breeders the economic environment is often unstable, as described in detail in

capability II.<sup>114</sup> They therefore engage in different strategies to gain leverage in their economic security. Different farming and breeding systems around the world have varying needs with regard to seeds. Seed property regimes need to fit these specific needs for this capability to be realised. In affluent settings, farmers might use high yielding varieties that are compatible with the use of machines, and which need as little pesticide input as possible.

In settings of scarcity, access to the right seeds is even more existential, as farmer-breeders directly rely on harvest for both sustenance and income. Seeds are a large cost factor of production (see capability II; also Batt & Rexha, 1999), and farmer-breeders in scarcity settings directly rely on their produce for sustenance of their families. Diversified agriculture leads to more stable yield and income for small-scale farmer-breeders (Almekinders & Louwaars, 2002; Altieri et al., 2012; IPES-Food, 2016; Osman & Chable, 2009). It, however, requires access to a diversity of varieties and landraces, including crops which are of little interest for the world market and overlooked in breeding (Dedeurwaerdere, 2012; IPES-Food, 2016).<sup>115</sup>

Relying on few businesses to provide seeds is a source of uncertainty (see capability II). Farmer-breeders need to rebuy seeds every year, due to biological (hybridisation, genetic modification) and legal (licenses and patents) reproductive restrictions of seeds enforced by private property regimes.<sup>116</sup> This is a financial challenge for them. Additionally, knowledge about seed multiplication and breeding gets lost if seeds are consistently bought and restricted for saving and breeding (see capability VIII). To realise this capability, farmer-breeders must maintain autonomy.

This includes questions of access (Altieri et al., 2012), especially to local crop varieties, which are seen as fundamental for the food security of much of the world's population (Pautasso et al., 2013; also see capability I). These varieties are adapted to specific environmental conditions and often serve a broader range of uses (e.g., usability of leaves and stems as building material, animal fodder or fuel; Almekinders & Louwaars, 2002). Moreover, they may serve cultural purposes, such as specific rice varieties for certain local dishes (ibid.), or exhibit certain preservation qualities (Maggs-Kölling & Christiansen, 2003).

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114 Capabilities II and III show considerable overlap and are difficult to distinguish adequately. However, it still seems important to formulate a capability specifically for the economic capabilities seeds provide, as seeds are considered primarily economic goods in common understanding.

115 Such as certain African root crops, see chapter 2.3 *Of Seeds and Humans*.

116 See chapter 2.3 *Of Seeds and Humans*.

These seeds are unavailable in the formal seed sector (Almekinders & Louwaars, 2002; Altieri et al., 2012), so the ability and right to save seeds and develop own varieties is fundamental for farmer-breeders. Regionally, farmer-breeders are organised in informal supply systems independent from market structures, and self-sufficient with regard to seeds. They are resilient and provide affordable seeds (Osman & Chable, 2009; Pautasso et al., 2013), but seed homogeneity is not sufficient for sale on the world market. Farmer-breeders generally prefer to strive for sufficient financial resources, not to gain wealth.<sup>117</sup> The amount of work required, however, may still touch on self-exploitation.

#### **IV. Social relations and respect**

This capability describes the need for farmer-breeders to engage in various forms of social interaction (Nussbaum, 2003), be part of social networks, as well as give and receive social support (Robeyns, 2003). An important aspect of these social relations is to be respected and treated with dignity (*ibid.*).

Social interaction and respect in seed use is mainly addressed in literature concerning farmer-breeders in commons-based seed regimes in less affluent settings. Seed exchange mechanisms may establish and enhance community networks (Almekinders & Louwaars, 2002; Pautasso et al., 2013). These networks also work as platforms for sharing knowledge and practices (Almekinders & Louwaars, 2002; also see capability VIII), enabling actors to receive and give support, as well as recognition and appreciation for their breeding and seed conservation.

Seeds matter for social status. In Syria, Galié et al. (2017) describe how women farmer-breeders gain respect in their communities by providing reliable, high-quality seeds and lose it if their seeds fail. Being the primary custodian of seeds also contributes to intra-household status for women.

#### **V. Relations to other species and nature**

This capability describes being able to live in a vibrant and just connection with animals, plants, and the rest of nature (Nussbaum, 1995, 2000, 2003).

Farmer-breeders have intricate understandings of crop plants and seeds, as well as their interrelations with each other and the natural environment. Breeders establish close personal or emotional relationships to plants during breeding. Instead of exhausting their breeding goals, breeders might therefore concern themselves with the vivacity of the plants and their prospect of coevolving with

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<sup>117</sup> Personal communication with Jack Kloppenburg, 22.03.2019.



their surroundings in the field. It can also mean striving for a balance between growth and ripening of the plant (Osman & Chable, 2009). Caring for plants in this personal and coevolutionary way can enrich farmer-breeders personally, because they sense a connection to nature.<sup>118</sup>

## **VI. Transcendence and religion**

This capability describes being able to choose (not) to live according to a religion (Robeyns, 2003) or connect with some beyond-reality source of meaning (Grisez et al., 1987).

Both in settings of affluence and scarcity, seeds are described as part of religious ceremonies or cornerstones of culture, especially for indigenous belief systems. Examples vary across cultures: plants are believed to be home to spirits (Weiss, 1979), religious dishes require a specific variety of grain (Arndt, 1961) or ceremonies are shaped around seeds and farming (Cook & Offit, 2008). It is possible that religious motives are less relevant for farmer-breeders today.

Farmer-breeders may form transcendental beliefs around seeds as well. Seed savers and breeders of a heritage seed bank in the US feel that they are “stewards [of a] living legacy” of humankind (Carolan, 2007, p. 741). It is difficult, however, to distinguish transcendence from sensemaking (discussed in capabilities II and IX).

## **VII. Political involvement**

This capability is concerned with the ability of actors to participate effectively in the political choices that govern their lives (Nussbaum, 2003; Robeyns, 2017).

Political decisions shape the working environment for farmer-breeders. This capability describes the formal and informal possibilities farmer-breeders have to influence political decisions concerning their craft, especially for seeds, farming, and breeding.

Farming, with its substantial importance for sustenance and need for large tracts of land, is a central policy field in countries around the world. Farming practice is hence strongly shaped by laws, regulations, and subsidies on national and regional levels. Breeding is also institutionally regulated, both in its technical possibility and in its access to plant genetic material. Here, many

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118 This connection with the plants is not considered in research so far. However, when attending farmer-breeders’ meetings, they continuously hint at this capability, which leads me to include it despite thin scientific backup.

regulations are set at an international level (e.g., ITPGRFA, UPOV, TRIPS). While all actors in democracies formally have equal rights to have their opinions heard and taken into account, influence always depends on economic and organisational power and gives specific actors an advantage in political decision making processes (Dryzek, 2015; Frison, 2018b). To describe factual political influence, not only formal political structures need to be recognised, but also informal practices and power structures (Pickering & Dryzek, 2018). The control over seeds as productive resources and the cultural elements entrenched in them, are political. Farmer-breeders might have a higher (perceived) political influence when engaging in relevant farmer-breeder networks. A number of activist groups and movements focus specifically on political action for seed sovereignty, such as Via Campesina, Navdanya and the Open Source seed Initiative (OSSI; Kloppenburg, 2014).

### **VIII. Education and knowledge**

Humans have an inherent wish to understand the world around them in order to effectively interact with it. This capability describes the ability of actors to become educated in their profession and to use and produce knowledge about their craft (Robeyns, 2003).

Concerning seeds, farmer-breeders have vast possibilities to gain and produce knowledge of both an abstract and a practical kind. While for farming some farmer-breeders might be content with information for successful cultivation of seeds, for breeding they need more detailed information to perform their work successfully.

A key component for this capability is the accessibility of information about varieties, including information about breeding processes, parental lines, and the variety's needs in cultivation. Seed property regimes all provide some information about seeds for farmer-breeders, but it differs in extent and detail, information source, and formality. Private-property based seed suppliers help their customers with knowledge on successful farming of their varieties (Batt & Rexha, 1999), but do not necessarily disclose information relevant for further breeding. In commons-based seed regimes, information is commonly shared more openly, for example in seed exchange networks or at occasions

for exchange (Pautasso et al., 2013). Practitioners furthermore strive to preserve and share genetic information autonomously, for example through community seed banks.<sup>119</sup>

Several studies identify older farmer-breeders (Osman & Chable, 2009) and women (Almekinders & Louwaars, 2002; Altieri et al., 2012) as key actors who are most likely to hold seed knowledge, both in settings of affluence and scarcity. Farmer-breeders in commons based seed systems can also benefit from technical support provided by private property seed regimes (Almekinders & Louwaars, 2002). Even more comprehensively, farmer-breeders in both property regimes can share their knowledge for breeding, enabling other actors to experiment in the field, ensure high quality in seed saving (conservation breeding), and develop their own varieties. Seed knowledge is region-specific (Almekinders & Louwaars, 2002), especially for landraces.

Detrimental factors for farmer-breeders in gaining seed knowledge might include the need for monetary and time resources to access education on seeds and breeding. Furthermore, if breeding activities are carried out by organisations or companies, it is paramount that knowledge sharing is allowed in the institution. Lastly, modern high yielding varieties are accused of deskilling farmer-breeders (Pautasso et al., 2013), because of their legal protection (which can prevent more advanced seed use, such as seed saving and breeding) and unspecific regional application.

## **IX. Excellence in work and play through sense, imagination and reasoning**

This capability describes components of autonomy and self-expression, both in work and play, using sense, imagination, and reasoning. Actors can experience and produce works and events of their own choice. They include creative projects (formerly described as artistic by Robeyns, 2003), the ability to express meanings and serve a purpose (Grisez et al., 1987), and the exercise of practical reason in work (Nussbaum, 2003). Put differently, the capability describes the ability to use the whole array of mental functions freely and pursue one's chosen goals for personal sensemaking.

For farmer-breeders that can mean saving seeds, pursuing own breeding projects and preserving cultural heritage through seeds. Farmer-breeders need to meet two preconditions to be able to purposefully, reasonably, and creatively

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119 Personal communication with Jack Kloppenburg, 22.03.2019. He mentions community seed banks as a common, decentralised practice in circumstances of scarcity, but few initiatives in affluent settings, such as *The seed Savers Exchange* in the US or *Arche Noah* in Austria.

work with and through seeds: (1) farmer-breeders need to have access to seeds and information about them and (2) farmer-breeders need to hold knowledge and self-confidence about the seed saving or breeding process.

Seeds and varieties as goods are restricted in their further uses to widely differing degrees. Most landraces and unregistered varieties can be freely used and developed further, while most private property varieties entail legal and/or biological measures restricting their further use (Girard, 2015).

Knowledge about seed saving and breeding can be formally learned in education institutions or workshops or be informally acquired through exchange among peers and trial and error learning (see capability VIII). Mutual exchange of knowledge and information amongst likeminded actors contributes to excellence in seed practices.

Depending on the social and cultural setting, farmer-breeders are more or less likely to pursue their own breeding projects. For example, in societies where farming with landraces is common and people have been holding regional or family varieties for centuries, it might be more likely for them to experiment with seed saving and breeding themselves, whereas in farming cultures that were industrialised early, saving seeds may seem inferior, and less desirable to buying professionally bred varieties.

Seed saving, breeding and conservation breeding are creative processes, which also increase autonomy, if undertaken by farmer-breeders themselves (this links to capability III). Depending on farmer-breeders' perception of their work, these practices might help them to experience excellence and an increased sense of pride in their work. For other farmers, however, excellence in their work with seeds means finding an excellent seed supplier who enables them to choose and buy the most profitable seed each year, and not to have to undertake any seed saving or breeding projects themselves.

## **X. Aesthetic experience**

This capability describes the ability to appreciate beauty, as an intense engagement of the human capacities of knowledge and feeling, in one's life and work (Grisez et al., 1987). Beauty is subjective, so there might be differences between what actors regard as beautiful, some preferring agrobiodiversity over monoculture and others the reverse.

Farmer-breeders may appreciate the aesthetic pleasure of the seed itself, of the plant and growing process, or the aesthetic appreciation of agrobiodiversity. They can also find beauty in working in and with nature, and in transforming

nature when planting and breeding. Crop species are often selected for sensual qualities such as color, smell and taste (Osman & Chable, 2009).

This list of capabilities for seed commons completes the theoretical foundation of this thesis. The next chapter explains the methodology of my empirics, before fusing both together to elaborate on findings.

## 4 Methodology

To understand how the well-being of farmer-breeders is influenced by the seed commons they participate in, this thesis applies a transdisciplinary sustainability research approach. The overall research design is explained in chapter 4.1 *Transdisciplinary Research Design*.

Methodologically, I apply qualitative empirical social research (Bryman, 2016; Flick, 2019; Mayring, 2015), using case studies (Yin, 2018) and qualitative interviews (Gläser & Laudel, 2010; Misoch, 2019). The qualitative research design and analysis is introduced in chapter 4.2 *Research Methods, Data Collection and Analysis*. The case studies are introduced in chapter 4.3 *Case Studies: The German Breeder Association Kultursaat e. V. and the Philippine Farmer-Breeder Network MASIPAG*.

### 4.1 Transdisciplinary Research Design

Transdisciplinary research is an approach that draws on various forms of knowledge and connects interdisciplinary scientists and practitioners on the same level (Brandt et al., 2013; Jahn, 2008; Lang et al., 2012; Mauser et al., 2013). It is also called *mode 2 science* (Gibbons, 1994; Schneidewind et al., 2016), as it is less disciplinary, hierarchical and homogenous than classical epistemological approaches in science. This equalisation of knowledge forms, makes transdisciplinary research especially suitable for sustainability topics (Hadorn et al., 2006; Schneidewind et al., 2016), because it deals with complex and fluid real-world settings by integrating interdisciplinary scientific and practical knowledge. The same goes for seed commons. By regarding knowledge from different actors as valuable, transdisciplinary research strengthens bonds between science and society and is therefore especially solution- and action-oriented (Kates, 2001; Lang et al., 2012).

A transdisciplinary research design is suitable for this work for three reasons. First, researching well-being implications of seed commons needs to take place in a real-world setting, as commons are harder to simplify and simulate through laboratory settings than private property relations, due to their multi-normative and specific internal logics. Seed commons as my central research elements,

are embedded in social-ecological systems and conceptualised with regard to those systems. To adequately grasp this embeddedness and the community-specific internal logics of my case studies, requires the experiential and expert knowledge of the farmer-breeders who shape them. Second, this thesis originates in the context of the research project *RightSeeds*, which assesses the transformative impact of seed commons for sustainable crop production under circumstances of affluence (Germany) and scarcity (Philippines), applying a transdisciplinary research approach.<sup>120</sup> Especially for traditional food systems, such as those present in parts of the Philippines, traditional knowledge plays a central role in resilient farming and preservation of agrobiodiversity (Cabell & Oelofse, 2012; FAO 2019; Salgotra & Gupta, 2015). It should also be regarded when conducting research to “incorporate the meanings, experiential knowledge, and normative perspectives of commoners” (Vivero-Pol et al., 2019, p. 5; also Dedeurwaerdere, 2014). Furthermore, culturally specific knowledge should be integrated in transdisciplinary research if appropriate (Mauser et al., 2013), which can also be done through practitioners’ knowledge. Third, the underlying motive of *RightSeeds* is food system transformation and this thesis contributes to that aim. Transformation studies require socially robust knowledge (Hirsch Hadorn et al., 2008), which has both practical and scientific relevance (Kates, 2001). Transdisciplinarity is also suitable for that.

Three types of knowledge are produced in transdisciplinary research (Adler et al., 2018; Brandt et al., 2013; Mauser et al., 2013). *System knowledge*, which describes elements, paradigms, and logics of the current situation. *Target knowledge*, which develops a vision for a sustainable future alternative to the current state and typically includes values and normative goals. And *transformation knowledge*, which explains what and how things must shift in the current situation, so it can turn into the sustainable future scenario.

This thesis lays an emphasis on generating system knowledge of individual well-being in seed commons, as this aspect of social sustainability in seed commons has not been assessed comprehensively before.<sup>121</sup> Target knowledge for

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120 “*RightSeeds? – commons-based rights on seeds and seed varieties for a social-ecological transformation of plant-cultivation*” is a transdisciplinary project funded by the German Federal Ministry of Research and Education (BMBF). For more information see the Preface or visit: [www.rightseeds.de/en](http://www.rightseeds.de/en).

121 (Seed) Commons are viewed as being sustainable, however, these claims are not always adequately backed by research (see *An Overview of Commons Theory*). This thesis contributes to the question of social sustainability of commons through the example of seed commons and hence takes a normative stance. Finding a balance between normative assumptions towards the research topic and a critical objectivity is a challenge in transdisciplinary studies. The research design of this thesis includes critical aspects of seed commons in various ways:

the case of seed commons is created within the research project *RightSeeds*. It names the normative goals of seed commons in a sustainability context, which they can then be assessed against, in terms of their success. My thesis picks up this target knowledge from *RightSeeds* and validates it, especially for a social sustainability context. Transformation knowledge is then developed by identifying where predominant seed systems lack the ability to realise similar well-being in their institutional and practice structures, and find ways to integrate them. The last point is not a focus of this thesis; only system knowledge and target knowledge are predominantly addressed.

The research design of transdisciplinary research is built up of three phases (Bergmann, 2010; Mauser et al., 2013): research *co-design* (getting on the same page with understanding the problem, research question and research goals), *co-production* of knowledge (socio-ecologically embedded and solution-oriented), and *co-dissemination* of research results (both in science and practice). Scientific actors and practitioners work most closely in the first and third phase, while the second is typically more scientifically focused (Mauser et al., 2013). Therefore, dissertation projects, which are required to be single author documents by most universities, are best fitted into the co-production phase.

This thesis project benefits from the co-design phase of *RightSeeds*.<sup>122</sup> It generates both system and target knowledge through the conceptualisation of seed commons by researchers and farmer-breeders. This thesis conceptually builds on outcomes of this process in order to contribute its findings to *RightSeeds*

In the co-production phase, I design the seed commons capability list and discuss it with interdisciplinary scientists as well as the coordinators of Kultursaat and MASIPAG. The list of eleven capabilities (see chapter 3.2 *The Capability Approach for Seed Commons*) is the core of qualitative interviews conducted with farmer-breeders of both organisations. This dissertation project, as my autonomous research contribution to *RightSeeds*, is entirely set in this second phase.

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in the interviews, questions are phrased neutrally or in both positive and negative ways (for example, *How does working with MASIPAG influence your health?; How does working with MASIPAG influence your stress and worries, relaxation?*) and in the research phases, talks with farmer-breeders and coordinators include reflections on preferable aspects of private property seed systems as the alternative to seed commons.

- 122 Mainly taking place in March 2017 with the workshop *Seeds and Varieties as Commons*, it allows scientists and practitioners to create joint understandings of central concepts such as seed, variety and agrobiodiversity. The development of the seed commons concept is initialised and finalised in recursive bilateral discussions between the project group and the case study partners in the months after. Seed commons serve as a boundary object (Reyers et al., 2010) which facilitates knowledge and value integration between diverse actors.



Co-dissemination of my findings is integrated in various products of *RightSeeds*, such as a communication paper for vegetable consumers and a policy brief to strengthen the advocacy work of the initiative. My work contributes to these products by ensuring the integration of values and needs of farmer-breeders.

To generate real-world and embedded transdisciplinary knowledge, case study research (Yin, 2018) is the method of this thesis.

## **4.2 Research Methods, Data Collection and Analysis**

To answer my research question and consider the transdisciplinary design of my thesis, methods of empirical social research are applied.

### *Qualitative research*

Qualitative research is chosen for three reasons. First, no structured former research has been undertaken on seed commons and individual well-being so far, which makes it an open field in need of exploratory theory building. Qualitative research is less bound to preconfigured structures than quantitative research and thus has the advantage of leaving room to grasp coherences and dependencies (Flick, 2019). Second, for an in-depth understanding and differentiated analysis of the two cases, qualitative analysis provides the required flexibility and possibility of recursiveness. Quality standards of qualitative research are reflexivity, flexibility, openness, subject relatedness and process orientation (Misoeh, 2019), amongst others. Almost the same criteria are found in the seed commons and seed commoning concepts, which makes theory (seed commons) and method (qualitative research) a good fit. Third, in a transdisciplinary research setting, farmer-breeders are not only objects of study, but co-creators of knowledge. That makes knowledge creation a discursive, hard to plan process. Qualitative methods provide the necessary flexibility, which is why they are recommended for transdisciplinary research (Pohl & Hadorn, 2008).

Two main steps comprise the qualitative transdisciplinary methodology of this work: Initially, a specific analytical frame is developed by fitting the capability approach to seed commons. After that, the frame is applied in a case study approach to find out how individual well-being is shaped by seed commons.

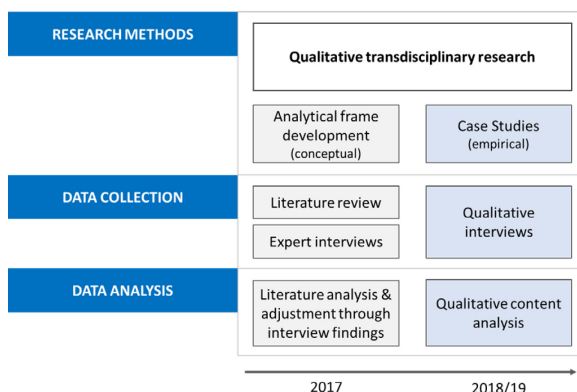


Figure 11: Research design showing qualitative methods, data collection and analysis approaches. Source: Own depiction

*Analytical frame development: the capability approach for seed commons*

As described in chapter 3.2 *The Capability Approach for Seed Commons*, the capability approach needs to be modelled to specific research topics to be analytically applicable (Robeyns, 2003). For seed commons this is done by collecting possible capabilities from existing dimensional lists of human well-being (Grisez et al., 1987; Max-Neef et al., 1986; Nussbaum, 2000, 2003; Robeyns, 2003). Then a literature review of seed commons is conducted<sup>123</sup> and recurring seed commons’ norms, practices and claims are noted. The collected capabilities are narrowed down by matching them with the seed commons’ insights. Capabilities which seem irrelevant are crossed out.

The resulting seed commons capability list (chapter 3.2 *The Capability Approach for Seed Commons*) is discussed with practitioners and scientists. For practitioners, three expert interviews are conducted with the coordinator of MASIPAG, the chairman of Kultursaat e. V. and a spokesperson of Navdanya<sup>124</sup>. Expert interviews focus less on the personal outlook of interviewees and more on their expertise in a specific field (Kaiser, 2014). Interviewing official representatives of seed commons initiatives is suitable, as they combine conventional and

123 Amongst others: Almekinders & Louwaars (2002); Altieri et al. (2012); Barbieri & Bocchi (2015); Galiè et al. (2017); Hampicke (2006); Lammerts van Bueren et al. (2011); Montenegro de Wit (2019); Osman & Chable (2009); Pautasso et al. (2013).

124 Navdanya is an Indian farmers organisation. Its views are included as it is one of the first and largest seed commons networks. The interview is conducted with Drona Chetri, a coordinator in the network. For their transparency, the network asks for a mention by name of their interview partner.

political seed sector knowledge with insights into collective actions practices of commons seed governance. The interview guidelines can be found in *Appendix F: Refinement of the Capability List for Seed Commons – Interview Directories*. For scientific deliberation, the list is embedded in a document explaining its formation process. Feedback is given by two seed system scholars, a commons professor and a philosopher, to adequately consider interdisciplinarity. This deliberation step is comparably less of a focus than the practitioner interviews, as comprehensive scientific knowledge is already considered through the preceding literature review. Taking all feedback into account, the capability list is revised according to critiques, suggestions, and extensions, which leaves a list of eleven capabilities. System knowledge about seed commons and their impact on individuals is built with this list. Consequently, it is the foundation of the qualitative interviews in the following case study research.

To ensure that farmer-breeders can ease into the interview process, the capabilities which are assessed as most straightforward to answer (for example, seed commons and economic security) are put to the front of the list. This changes the order of the capabilities. Findings are written in the order of capabilities as they appear in the interviews, not in order of the pre-revised capability list of chapter 3.2 *The Capability Approach for Seed Commons*.

*Table 1:* Development of analytical frame and qualitative case in accordance with transdisciplinary knowledge types. Source: Own depiction

RESEARCH QUESTION	RESEARCH METHOD	TRANS-DISCIPLINARY KNOWLEDGE	CHAPTER
<p>1. How can the capability approach be applied to seed commons?</p> <ul style="list-style-type: none"> <li>• What normative basis is needed to support the CA in this research? (see Robeyns 2003a)</li> <li>• Which capabilities should be measured and how are they identified? (see Robeyns 2003a)</li> </ul>	<p>Development of analytical frame: Literature review &amp; Expert discussions (science &amp; practice)</p>	System knowledge	3.2
<p>2. How are those capabilities met by seed commons in circumstances of affluence (Kultursaat e. V.) and scarcity (MASIPAG)?</p>	<p>Case study research using qualitative interviews and - analysis</p>	System knowledge; Backing of <i>RightSeeds</i> target knowledge	5 - 7

Table 1 shows the two-step process of, first, list development (as the analytical frame) and, building on this, case study research.

*Case study research of Kultursaat e. V. and MASIPAG using qualitative interviews*

**Case study research** is chosen for this qualitative comparative analysis. A case study “is an intensive study of a single case of a small number of cases that promises to shed light on a larger population of cases” (Gerring & Cojocaru, 2016, p. 3). Case studies allow comparison of cases to understand similarities and differences in structure and practices, without abandoning their specific contexts and socio-ecological embedding (van Bers et al., 2019; Yin, 2018). This fits well with my explorative research, explaining current collective action for seeds. Cases are selected according to a most-different strategy (Gerring & Cojocaru, 2016), to explore and explain similar outcomes of both cases (farmer-led seed commons) while in diverse settings (Germany and the Philippines, group size, social-economic and political environment, goals). This allows for comparison of specific capability outcomes and the ability to deduce which factors of seed commons shape the capability set and which do not. For data collection, interviews are used to bring the cases to life.

For this thesis, the cases of MASIPAG, a Philippine small-scale farmer network, and Kultursaat e. V., a German-speaking breeders’ association are chosen. They are introduced in detail in chapter 4.3 *Case Studies: The German Breeder Association Kultursaat e. V. and the Philippine Farmer-Breeder Network MASIPAG*. Both organisations are examples of seed commons. At the same time, they differ in their size, setting, management, and goals. The comparison of both initiatives benefits my research: First, it shows communalities of seed commons across geographic, socio-cultural, and legal contexts, through the aspects of seed commons which are similar between MASIPAG and Kultursaat e. V. Second, it becomes clearer how seed commons adapt to their socio-ecological environments. This is why two dissimilar and geographically distant case studies are chosen as beneficial to this research.

**Qualitative interviews** are especially suitable for case study research (Bryman, 2016; Yin, 2018). To balance the explicit research focus on capabilities with a general exploratory desire to understand seed commons in their embeddedness, semi-structured interviews are chosen (Kaiser, 2014). They guide interviewees to answer certain points, using an interview guideline, but remain flexible and able to include spontaneous follow-up questions to create unforeseen insights, as well as allowing for emphasis setting and additions by interviewees. Thereby, they exhibit general content control, while allowing for flexibility and understanding of general processes at the same time (Misoch, 2019). Using this soft structure also enables the interview to feel more like a conversation to the interviewee, as much as possible (Bryman, 2016), which should ease the

unnatural situation for the farmer-breeders and generate more natural and open answers.

Two interview guidelines, one for Kultursaat e. V. and one for MASIPAG, are used to allow for data comparison between cases in the analysis (Bryman, 2016; Misoch, 2019). The guidelines structure the interviews thematically along the eleven capabilities developed in the first research step (their order is changed slightly, see paragraph above). A shorter follow-up section asks about open points, future topics, and claims of the seed commons initiatives, to buffer possible remaining capability gaps. The interview guideline is developed in a recursive process, as suggested by Bryman (2016) and tested with colleagues and practitioners to make sure that it is thorough, able to be conducted in a timeframe of about one hour, and questions are phrased clearly. It includes a short information phase about my research aim and later use of data, a warm-up in which the farmer-breeder gives some background on themselves (as this is usually a familiar and easy topic), a main phase in which the eleven capabilities and future outlooks are discussed and a closing phase for any remaining open questions from the farmer breeders.<sup>125</sup> In addition to the guideline, a print out with the eleven capabilities arranged in a circle is used for farmer-breeders to reflect on which capabilities they personally deem as especially important and which as rather negligible. Both guidelines and the print outs can be found in *Appendix G: Main Interview Directories*

Interviews are conducted with members of Kultursaat e. V. and MASIPAG. For Kultursaat e. V., ten interviews are conducted with farmer-breeders at two association meetings in 2019. The interview setting is face-to-face in quiet places alongside the meetings and during breaks. Interview language is German. Interview acquisition takes place at the meetings through personal address and suggestions of other Kultursaat members.<sup>126</sup> For MASIPAG, eight interviews are conducted with twelve members during a one-week research stay in February 2019. The interview language is English. The current coordinator and the former coordinator are interviewed one on one, as well as two members of staff. Eight farmers and farmer-breeders are interviewed in pairs with a member of staff present to translate between English and Tagalog. Interview acquisition takes place up front with the coordinators. All other interview acquisitions are facilitated by them during the week. Interviews take place in separate rooms on the premises of the MASIPAG back-up farm.

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125 This general structure of interview guidelines is suggested by Misoch (2019).

126 Researchers of *RightSeeds* have been attending several of the association's meetings by that point and were known to most farmer-breeders by sight and personally to many.

The interviews are voice recorded, transcribed afterwards and anonymised. Transcription follows transcription rules by (Kuckartz, 2010). Emphasis is laid on content in the transcription, leaving out non-verbal expressions, silences, and obvious fillers (such as 'ahem'), as they are not relevant for this research.

Table 2 shows a table of all interviewees, their affiliation (Kultursaat e. V. or MASIPAG), their position within their organisation (farmer-breeders, staff or coordinator), the date on which the interview is conducted, the language of the interview, the number of interviewees present at the interview (usually one; two for MASIPAG's farmer-breeders), and the abbreviation which is used to code them in chapters 5 & 6 *Findings* and *Discussion of the Findings*.

Computer assisted **qualitative content analysis** is used to evaluate and interpret the resulting interview data (Kuckartz, 2010; Mayring, 2015), which is a well-established procedure to code qualitative interview data (Flick, 2019; Gläser & Laudel, 2010). The program MaxQDA is used to facilitate the process. More specifically, structuring content analysis is undertaken, in which pre-configured categories, in this case the eleven capabilities, structure the analysis by filtering the data set for thematic fit, support, critique and additions to the categories (Mayring, 2015).

A mix of inductive and deductive analysis is applied. Interviews are first coded along the set capabilities (acting as coding categories; deductive). Critique, additions, and corrections of the capabilities are included into the category in this first screening. Additionally, an extra code is set for valuable and noticeable mentions which do not fit any of the pre-set categories. In a second, inductive round of coding, these mismatches and additions are used to help distinguish the existing capabilities on the one hand and create two more capabilities from farmer-breeders' repeated mentions on the other hand. Data from Kultursaat e. V. and MASIPAG is coded in one file. MaxQDA allows for later filtering according to each capability, for results of the initiatives separately, or a combination of the two. This facilitates comparison of the cases on the one hand, by identifying similarities and differences, and of the capabilities on the other hand, to see where they thematically overlap.

Table 2: List of interviewees. Source: Own depiction

Initiative	Position	Date	Language & Translation	Number of interviewees	Abbreviated as
Kultursaat e. V.	farmer-breeder	23.11.2019	German	1	KS FB1
Kultursaat e. V.	farmer-breeder	20.07.2019	German	1	KS FB2
affiliated to Kultursaat e. V.	farmer-breeder	19.07.2019	German	1	KS FB3
Kultursaat e. V.	seed multiplier	23.11.2019	German	1	KS FB4
Kultursaat e. V.	farmer-breeder	20.07.2019	German	1	KS FB5
Kultursaat e. V.	farmer-breeder	20.07.2019	German	1	KS FB6
Kultursaat e. V.	farmer-breeder	21.07.2019	German	1	KS FB7
Kultursaat e. V.	farmer-breeder	23.11.2019	German	1	KS FB8
Kultursaat e. V.	farmer-breeder	23.11.2019	German	1	KS FB9
Kultursaat e. V.	breeding apprentice	23.11.2019	German	1	KS FB10
MASIPAG	former coordinator	09.02.2019	English	1	MAS CM1; MAS CM2
MASIPAG	coordinator	07.02.2019	English	1	MAS CP1; MAS CP2
MASIPAG	staff	03.02.2019	English	1	MAS ST1
MASIPAG	staff	03.02.2019	English	1	MAS ST2
MASIPAG	farmer leaders	04.02.2019	English (transl. Tagalog)	2	MAS FB1/FB2
MASIPAG	farmer trainer & farmer leader	07.02.2019	English	2	MAS FB3/FB4
MASIPAG	farmer-breeders	07.02.2019	English (transl. Tagalog)	2	MAS FB5/FB6
MASIPAG	farmer-leaders	30.01.2019	English (transl. Tagalog)	2	MAS FB7/FB8

With the capability analysis of seed commons, system knowledge is created, and target knowledge checked. System knowledge is created about seed commons. Being able to pinpoint how they affect individual well-being of the farmer-breeders involved, adds to commons and commoning knowledge regarding seeds. Target knowledge is checked, as seed commons are alternatives to the current industrial seed system. Seed commons' systems, aspects of them or their underlying logics, are thus target states for the currently socio-ecologically unsustainable private property seed regimes.

### *Reflection of methodology*

Reliability and validity should be ensured in qualitative content analysis as quality criteria (Mayring, 2015, following Krippendorff, 2013). Reliability

describes how precise and stable an analysis is, while validity asks, if indeed that is measured, which should be measured (ibid.).

**Validity** is subdivided into six forms: semantic, sample, correlative, prognostic, constructive and communicative validity. *Semantic validity* asks, if the categories are defined in a way that makes sense for the topic. This is first accounted for in the conceptual step of my analysis, when developing the capability list and then having it checked by scholars and practitioners in recursive loops. Second, it is addressed with the two-step coding process, as text passages are generously coded under one category in step one and checked for their general homogeneity in step 2. This makes sense, as homogeneity can only be assessed after having an overview of all other passages coded in the same category, while it is impossible to determine after coding the first few interviews.

*Sample validity* asks if the sample reflects the overall phenomenon. In this case, the question is if Kultursaat e. V. and MASIPAG are representative examples of seed commons. For that, considerations are necessary as to which organisations exactly the term seed commons relate to. That is conceptually discussed and framed in the paper of Sievers-Glotzbach et al. (2020), which is the conceptual foundation of this thesis regarding seed commons. Kultursaat e. V. and MASIPAG are sensible examples, as they combine various aspects of seed commons between each other: breeding, seed saving, seed banks and political advocacy. Another question of sample validity is whether the sample is large enough to be representative for the population it is taken from. This is not the case for this research. Only two initiatives are chosen to take an in-depth, explorative approach. To generalize these findings of seed commons and well-being for all seed commons, further research will be necessary. The last question is how the sample should be selected. As described above, the two cases are not selected randomly, but picked to represent a broad spectrum of seed commons' practices, as well as being as culturally distinct as possible. This ensures the broadest exploratory knowledge extraction with this limited number of cases.

*Correlative validity* asks if a different method comes to similar conclusions with a similar research question and object of investigation. Kultursaat e. V. and MASIPAG are compared to the pool of existing seed commons regarding their basic criteria, organisational structures and practices in the paper of Sievers-Glotzbach et al. (2020). From this, general correlative validity is assumed for both cases, and it is assumed as well, that my further research is valid in that regard, although there are no existing studies yet to correlate it with.



*Prognostic validity* asks if reasonable prognostics can be developed from the material and then verified over time. As my research has no explanatory focus, only a describing focus, this validity measure does not apply.

*Constructive validity* asks if the chosen method is fit to answer the research question. This is done by researching which theories and models already exist in the particular research field, and what experience exists with the context of the material. I discuss both of these in the previous chapters *On Well-Being*, *Seed Commons*, and *The Capability Approach for Seed Commons*. The decision for a research approach in that context can be validated by expert opinions, which I do by recursively discussing the capability list for seed commons with researchers and practitioners.

Finally, *communicative validation* is achieved by discussing results with practitioners. This final step was to be undertaken in 2020 and hampered by the COVID-19 pandemic, which prevented a visit from MASIPAG to Germany and association meetings for Kultursaat. As those would have been the events where my research results were discussed, this communicative validation is not undertaken for this research of individual well-being in seed commons, which is a validity shortcoming of my work.

**Reliability** is the second methodological quality aspect. It anchors in three sub-concepts: stability, reproducibility, and accuracy. For stability, Mayring (2015) suggests to start the same analysis fresh and see if one gets similar results. This is called intracoder-reliability. A soft form of this reliability is applied by coding all interviews in the same categories (in this case, the capabilities). Over time, these capabilities become clearer (inductive coding). I then go through another coding round with the interviews already coded to adapt my coding to the changes in category distinction. While this conduct is different to starting data evaluation anew, the process ensures equal coding of all interviews and capabilities.

The second aspect of reliability – reproducibility – asks if the analysis would generate the same results under different circumstances. This can be measured through intercoder-reliability. As the coding is done in a partly inductive process, having another person code part of the data cannot account for category changes developing from the interviews themselves. It would be necessary for another person to go through the whole coding process, which is deemed too time intensive. Instead, the sensibility of my conclusions on the capabilities is repeatedly discussed within the *RightSeeds* team, whose researchers are as intimately familiar with the two case study organisations as me.

Accuracy asks if the analysis adheres to a functional standard. This cannot be answered yet, as the capability list as an instrument is explorative and new. Accuracy places a focus on category distinction. As described above, this is developed in the coding process. All in all, as this research is exploratory, more similar research is necessary to judge the reliability of the capability list of seed commons as an instrument to assess individual well-being in seed commons arrangements.

Flick (2019) suggests a triangulation approach to increase validity and reliability of qualitative research designs by using not only one, but several methods. This allows for a more comprehensive view of the topic or case. He distinguishes four types of triangulation (ibid.): data triangulation (several data types and sources), methodological triangulation (several methods or several components within one method), theory triangulation (several strands of theories), and investigator triangulation (more than one researcher). This research applies theory triangulation in combining well-being research and commons theory. By explaining which parts of farmer-breeders' well-being is affected by commons structures and how, it gives a more differentiated view on the subject than the use of only one of the theories would. The other forms of triangulation are used softly in this research. In terms of methodological triangulation, qualitative interviews as the central methodological tools are supplemented by other elements.<sup>127</sup> First, at the end of the interviews, participants are asked to circle the capabilities they deem most and least important on a separate sheet of paper, which displays all capabilities discussed. This is a soft form of quantitative data collection and helps to assess the overall importance of the individual capabilities, as well as whether certain capabilities are systematically favoured by farmer-breeders, or if their importance is due to individual preferences. Second, the interviews are embedded in a multi-year review of the case study initiatives. While these are not organised participant observations, knowledge developed through event participation and personal conversations back the analysis of the qualitative interviews with knowledge about organisational structures and values, political advocacy, and the like. Data triangulation is likewise applied in a weak form through the inclusion of interview data, both from farmer-breeders themselves and coordinators of the organisations. Lastly, investigator triangulation, which includes discussion of results with the participants themselves (Gibbs, 2012), failed to be applied due to the COVID-19 pandemic, as noted above and therefore is a shortcoming.

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127 This is often done to complement qualitative interviews as research instruments (Flick, 2010).

A few open points remain in the data collection. Circumstances for the interviews of Kultursaat e. V. and MASIPAG vary, and the interviews are adapted accordingly. First, **different interview guidelines** are written out for both initiatives. Kultursaat's interview guideline is in German. It includes two short, personal introductory questions, twelve questions about capabilities<sup>128</sup>, a ranking of the capabilities into most and least important and concluding questions about seed claims and their assessment of the association's future outlook. MASIPAG's interview guideline is phrased in English and more extensive. It includes background questions on seed handling, organisational structures and resilience, some of which are part of my colleague Lea Kliem's work. This is done for two reasons. First, the research stay on the Philippines was scheduled over seven days of workshops. Contrary to Kultursaat e. V. where comprehensive organisational knowledge is built through attendance at association meetings over two years before the interviews take place, knowledge building for MASIPAG had to happen in parallel with the interviews. The formal interview setting was thus also used to build organisational knowledge, in order to build a similar knowledge level for MASIPAG as for Kultursaat e. V. Combining both my and my colleague's interviews has pragmatic reasons as well. Interviews happen spontaneously alongside the workshop program during the research stay and mostly need a translator. Also, some farmer-breeders only attend the workshop for a day or two. Holding one interview instead of two is more feasible under these circumstances. Similar explanations hold for the selection of **different interview partners**. While only farmer-breeders and multipliers are interviewed for Kultursaat e. V., for MASIPAG, coordinators, staff, and non-breeding farmers are also interviewed. The idea behind this is that coordinators and staff have an overview of the breadth of farmers in the large network and their answers are used to assess if the farmer-breeders' answers hold for the general MASIPAG farmer, or are individually or regionally specific. Interviewing non-breeding farmers is also done to include a general MASIPAG farmer perspective into the research, as only 20 of several thousand farmers are farmer-breeders in MASIPAG. Adaptations are made with the purpose of obtaining the most realistic picture of the organisation and a stereotypical member as possible, to thus enable comparison between the initiatives, although they differ in organisation, location and cultural setting.

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128 The first capability, control over one's economic future, is split in two questions. One is about the individual future, one about the future of other farmers. The second question is included to learn more about the value base of the Kultursaat farmer-breeders. As they usually breed one or two crop species at a time, but have diversified farms for which they buy seeds, the connection between their breeding efforts and their income is less direct than it is for MASIPAG's subsistence farmers.

This research approach yields an explorative and qualitative view on the social sustainability of seed commons. The generated insights are only partially able to be generalised, and need backing with more extensive and quantitative research, for example by adding case studies in the same and other countries, as will also be noted in chapter 7 *Conclusion and Outlook*.

### **4.3 Case Studies: The German Breeder Association Kultursaat e. V. and the Philippine Farmer-Breeder Network MASIPAG**

Two case studies provide the basis for this research: the Philippine farmer network MASIPAG and the German breeders' association Kultursaat e. V. This chapter gives an overview of each of them, touching on the environmental and political conditions of the organisations, as well as their material, social and regulative aspects.

#### *MASIPAG*

**MASIPAG** is a network of small-scale farmers and farmer-breeders, scientists, and non-governmental organisations in the Philippines. It aims to promote diversified<sup>129</sup>, integrated<sup>130</sup> organic farming to support long-term farmer empowerment, seed sovereignty, and food security. MASIPAG calls this strategy farmer-led sustainable agriculture. It has proven successful in increasing food security and improving health for farmers through a more diverse selection of planted crops and resulting diet diversification (Bachmann et al. 2009). The practices of MASIPAG's farmers include community seed banks, seed exchange, agricultural knowledge creation, as well as the dissemination and farmer-led breeding of locally adapted crops and livestock.

The Philippines is an archipelago in the western Pacific Ocean, consisting of over 7,000 islands (Cullinane et al., 2021; see Figure 12). It has a population of almost 110 million people, of which more than half lives in rural areas (ibid.). Almost one third of the population is employed in agriculture and the main cultivated crop is rice (ibid.). The Philippines have a Gini-index<sup>131</sup> of

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129 MASIPAG uses the term diversified to describe the fact that several plant and animal species are used on a farm, opposed to only planting rice, for example.

130 Integrated farming is a term to describe using as few as possible external inputs on a farm and relying instead on cross-sectional farm benefits (e.g., manure as fertilizer) and natural solutions (e.g., intercropping insect repellent plants instead of using chemical pesticides).

131 The Gini-index measures the degree of wealth-inequality within a country. If wealth is spread perfectly equally, the Gini-index would be 0. If one person holds all wealth in a country, the index would be 1. Higher Gini-indices thus indicate higher intra-country inequality. Numbers are usually given as a percent and written as, for example, 32.4 instead of 0.324.

42.3 (data for 2018; World Bank, 2021), which puts them in the middle field globally, with slightly more unequal wealth distribution than Germany with 31.9 (data for 2016; *ibid.*).

Politically, the Philippines is a democracy (*ibid.*). The current president, Duterte, is known for his ruthless and violent fight against drugs and crime (Senzel, 2021). Over 300 years of Spanish rule from the 16<sup>th</sup> century onwards are still visible in the predominantly Roman Catholic faith (Cullinane et al., 2021) and widespread Spanish surnames. Armed groups with political interests are present in the country (*ibid.*). Small-scale farmers in particular face financial and social constraints and it is not uncommon to farm for subsistence, rather than wealth.

Magsasaka at Siyentipiko para sa Pag-unlad ng Agrikultura or MASIPAG (which translates from Tagalog into ‘Farmer-Scientist Partnership for Development’) consists of over 7,000 individual members (small-scale farmers) and reaches over 3,000 individuals, counting the farmer-breeders’ households. The organisation was founded in 1985 with the aim of improving the well-being of small-scale farmers, and sustain (rice) agrobiodiversity in the Philippines through farmer-led collection and breeding of traditional varieties (Medina 2011). MASIPAG breeds and conserves a wide variety of crops and livestock, such as corn and poultry. However, its main efforts are directed towards farmer-led seed conservation and improvement toward climate change resilient rice varieties. The network operates in more than 60 Filipino provinces and maintains over 2,500 rice varieties and selections. It is financially supported by European non-governmental organisations. The main funder is MISEREOR, whose funding helps to employ a handful of coordinating staff on a national and regional level.



Figure 12: Map of the Philippines, indicating the three main areas of Luzon, Visayas and Mindanao from North to South. Source: <https://www.nationsonline.org/oneworld/map/philippines-political-map.htm>

MASIPAG<sup>132</sup> works with a multi-level, farmer-led structure with flat hierarchies (see Figure 13). It builds on polycentric, bottom-up governance, represented by *Provincial Consultative Bodies* (PCB). They are MASIPAG’s most basic official units that coordinate provincial (political) activities and trainings, monitor progress in the region, and serve as institutions for conflict resolution.

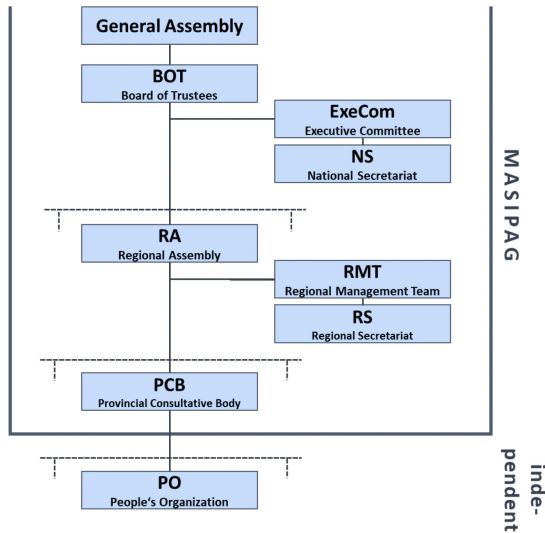


Figure 13: MASIPAG’s structure. Source: Own depiction based on a project-workshop conducted with the network on the Philippines in January 2019

Each PCB consists of representatives from independent People’s Organisations (POs) in the region. Farmers sometimes form POs to be able to participate in MASIPAG. Often, they are already organised for other reasons, however, and then join MASIPAG as an existing group. MASIPAG’s highest decision-making bodies in each province and on a national level are annual *Regional* and *General Assemblies*. They take strategic decisions and set the network’s ongoing program. A *National Executive Committee* (ExeCom), *Regional* and *National Secretariats* and *Regional Management Teams* coordinate the various

132 The detailed information on MASIPAG’s organisational structure is collected from the one-week research stay at MASIPAG’s back-up farm in Nueva Ecija in 2019. Formal and informal conversations with coordinators, staff and farmer-breeders are included in this description.

governance levels and their activities. On all levels of decision-making, farmers outnumber MASIPAG staff and external experts, which ensures farmer-led decision making.

The independent POs are the smallest units who join MASIPAG as members. They are local groups of 10–50 farmers and farmer-breeders who work together to sustain a stock of rice varieties. As of 2022, 511 POs were members of the network.<sup>133</sup> It is a prerequisite to be member of a PO to participate in MASIPAG. These farmer groups are financially and organisationally autonomous but are encouraged to work with democratic decision-making structures. They take decisions and set their agenda freely, with the only obligation to adhere to MASIPAG's core values of organic agriculture and seed sharing. Each PO maintains a *trial farm* where farmers plant, screen and maintain at least 50 rice landraces.<sup>134</sup> Farmers test their rice varieties for their adaptability to local environmental conditions, before multiplying the most favourable ones and planting them in their fields. The POs also report their findings back to the *national backup farm* (NBUF), where a register of drought-, salinity- and flood-resistant varieties is kept. Through this practice, farmers actively create seed knowledge and strengthen their decision-making capacity, which is seen as a cornerstone for farmers' independence and empowerment. Participation in POs creates smaller communities, in which every farmer needs to directly engage in self-organisation, deliberation, and mediation with peers, some of the characteristics of commoning<sup>135</sup>.

On a PO level, the integration into the network and its full body of knowledge follows a flexible step by step approach. First, farmers shift to organic production for their main crop (usually rice). After that, they receive the basic training from MASIPAG's farmer-trainers<sup>136</sup>, which involves how to implement an organic, diversified, and integrated farming system (DIFS) on their farms, including soil fertility management and alternative pest management. This is

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133 Information from a fact check with the MASIPAG national office in 2022.

134 They obtain the first seeds from MASIPAG and can request others if need be.

135 Farmer communities establish as farmers jointly organise and deliberate their seed selection and production on their trial farm. In established POs, the communities grow into micro-support networks. If additional workforce is needed on a farm, for example, the community provides it through an old Filipino community practice called 'Baya nihan', which revives in the network's communities. A farmer provides tools (and coffee, as one of the farmers stresses in a personal encounter) and the community helps him to complete his task in expectation of receiving free help in turn if needed later.

136 Farmer-trainers are experienced farmers trained in didactics. They pass on their formal knowledge, their personal experience, and skills (tacit knowledge), as well as MASIPAG's attitude to new MASIPAG farmers in training designed for specific topics.



the first step for them to achieve food security through greater resilience to the vagaries of both markets and climate. Once the POs have implemented DIFS, they can request further training and support in areas they feel the most need. This could be marketing, political agenda setting, breeding rice or livestock, or climate change resilience, amongst others.

Representatives of several POs in a province meet regularly<sup>137</sup> to form a PCB and discuss provincial development agendas. The set of topics suggested by MASIPAG includes diversified agriculture and integrated farming, marketing, breeding programs, climate change resilience, and local politics. Specialists on these topics from each PCB additionally form transregional thematic committees to discuss and spread technical expertise. PCBs form the *Regional Assembly*. Finally, members from across the three main island regions form the *General Assembly* (see Figure 13). Member scientists and NGOs are part of the PCB where an active exchange of experiences, solutions and strategies takes place. Volunteering scientists who offer their expertise stem from various fields, including botanists and geneticists to management and organisation specialists. The PCBs also network with local and international non-governmental organisations.

MASIPAG operates the NBUF on the island of Luzon. Two further, provincial backup farms are voluntarily organised by farmer-breeders in Mindanao and the Visayas. At the BUF, all varieties obtained by MASIPAG are collected, stored and regularly replanted (in-situ conservation).<sup>138</sup> It currently holds over 2,500 rice varieties, distinguished as traditional varieties (TRVs), varieties bred by the network's farmer-breeders, and some formerly bred by volunteering scientists.<sup>139</sup> Filipino seed legislation does not require MASIPAG to register its varieties in order to disseminate them through non-monetary sharing and exchange (also see chapter 2.3 *Of Seeds and Humans*).

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137 They decide within the group how often to meet, but usually about once every three to four months.

138 They are replanted and characterised at least every three years (in-situ conservation) by the BUF managing farmer to refresh their vitality and quality.

139 MASIPAG's collection of varieties consists of approximately 600 traditional varieties (which have been pooled by farmers over time), 1300 MASIPAG varieties, and 500 farmer-bred varieties.

MASIPAG's seeds are open-pollinated and bred through bulk selection methods (Medina 2011) by about 11 farmer-breeders currently.<sup>140, 141</sup> Genetic modification and hybridisation are strictly rejected by the network. The varieties are specifically adapted to organic farming systems and are selected for climate change resilience. While the BUF holds samples of all varieties, the network's most important variety preservation mechanism is the nationwide distribution and use of the multitude of landraces by farmers. In this way, the varieties can adapt to local conditions and are living back-ups should one variety be lost on the BUF or in a particular region, due to a failed harvest or other misfortune.

Besides seeds, the collective knowledge of the farmer-breeders is the network's most valuable resource. This includes knowledge about seeds, farming practices and technologies, as well as (social) organisation and political advocacy. Both traditional agroecological and scientific knowledge are collected and developed by MASIPAG's farmers and volunteering scientists (Sievers-Glotzbach et al., 2021). To disperse knowledge throughout the network, relevant knowledge is formalised through a variety of practices and structures within MASIPAG.<sup>142</sup> The contextual embeddedness of farming technology is acknowledged. Instead of copy-pasting practices as blueprints from one PO to another, they are studied as concepts by the new PO and adapted to local culture and conditions. In addition, volunteering scientists aid the network with expertise in their fields of study. Most of MASIPAG's knowledge dispersion, however, occurs informally and directly between farmers. From a commons' theory standpoint, production, reproduction and use of seeds and knowledge

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140 To recognize the farmer-breeders' work, their initials are included in the variety name. Other than that, varieties bred within MASIPAG belong to the network and are collectively managed.

141 Farmers developing new knowledge, farming-technology or varieties are not compensated financially: "Breeding and seed production are thus not a source for farmers' income generation. However, replacing costly hybrid or certified seeds with farmer-saved seeds and synthetic fertilizers and chemical pesticides with low- to no-cost organic fertilizers and natural pest management, allows MASIPAG farmers to substantially reduce their input costs (c. f. Velasco, 2019)." (Sievers-Glotzbach et al., 2020).

142 Formal means include the Documentation and Dissemination of Farmer Developed/Adapted Technologies (FDAT) scheme, where area coordinators record new farming techniques developed by members. This can be adapted intercropping systems, harvesting, drying and storage innovations, or recipes for natural fertilizers and pesticides. Novel rice knowledge is specifically professionalised and centralised through the Collection, Identification, Maintenance, Multiplication and Evaluation (CIMME) programme. Farmers continually test the rice varieties in their trial farms and describe which specific characteristics and traits they exhibit in their particular environment and climate in Simplified Evaluation Sheets (SES). Information about local suitability and climate change resilience are sent back to the BUF. Variety knowledge is collected and formalised there to identify promising varieties to alleviate climate change related farming challenges.

are intimately intertwined within the organisation. MASIPAG observes that continued, decentralised use of seeds is the best way to ensure their reproduction.

To achieve farmer empowerment, MASIPAG sets up a distinct culture with certain norms, structures, and practices. Central practices are the bottom-up, *farmer-led*, and *farmer-scientist* partnership approaches. It is a shift of perspective towards farmers as experts in their field. As part of the basic training for POs, farmers are taught to observe their varieties and the local context in which these are being planted, note their findings, and draw conclusions from them to improve their yields and organic farming practices. They are empowered to choose or breed varieties adapted to their local conditions and (cultural) preferences. In effect, farmers take responsibility for their knowledge collection and knowledge production. An important norm is the network's principle that *seed is sacred*<sup>143</sup> and must not be sold but shared. This is why seed exchanges are a central element of the network's culture (Bachmann et al., 2009). At all meetings, no matter the organisational level, formal and informal seed and knowledge exchanges take place. MASIPAG's farmers revive and consolidate a seed sharing culture, with more than three-quarters of their members engaging in seed sharing.<sup>144</sup> The only restriction the network gives its farmers is that commercialisation of seeds is strictly forbidden. Finally, to ensure long-term seed sovereignty, MASIPAG strives to sustain and broaden Filipino (rice) agrobiodiversity. In practice, the sovereignty goal consists of two aspects: First, regarding materials and knowledge, individuals and communities need to be self-sufficient with their agricultural inputs. This is achieved through organic farming, on-farm production of seed, the use of organic fertilizers and pesticides and community sharing. Second, to achieve sovereignty, farmers need to hold extensive and intricate knowledge regarding low-input organic farming practices, which is what MASIPAG's formalised training conveys.<sup>145</sup>

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143 The full idea behind the phrase is that without seeds, there would be no plants on earth and hence no humans or animals either. So, seed is life. Life is sacred, as the bible teaches in the predominantly Christian country. In the logical conclusion, seed is sacred. Sacred things cannot be sold, and it is immoral to do so.

144 The network's seed and knowledge sharing does not stop at its fringes. It is a common practice to share seeds with neighbouring small-scale farmers or extended family outside the network. MASIPAG practices an open policy regarding this external sharing. The only requirement is to give an orientation on MASIPAG's value of sacred seed, as well as organic farming and seed saving. This short, impromptu lecture effectively reconnects (physical) seeds with seed knowledge.

145 The national coordinator (of 2022) specifies: "to achieve sovereignty, the continued assertion of their rights to seeds resources is needed to be self-reliant. As such, emphasis on organisational development such as reviving *baya nihan* (communal work), advocacy and local livelihoods are strengthened to contribute to rural development" (personal note).

MASIPAG is careful to stay in control of their varieties and protect them from appropriation by commercial actors. They cannot take legal measures to prevent appropriation, because they choose to not be legal owners of varieties bred by their farmers, as part of keeping them free for everybody to use. For protection, the network therefore refrains from listing their varieties in official local or national seed registries (e.g., the Filipino National Seed Industry Council or the Filipino Community Seed Registry) or open them for genetic analysis. It makes them costlier to be identified, analysed, and used by companies. MASIPAG fears that companies could co-opt seeds by registering them for variety protection or patent gene parts. This would equip varieties with intellectual property rights, thereby taking them out of farmers' hands. In effect, MASIPAG has built an open, alternative seed system where seeds are distributed as widely as possible. To protect it, it is kept as separate as possible from the formal Filipino and international seed regimes. For this reason, MASIPAG uses the term *seeds* for all their breeds, instead of the term *variety*. The latter is a legal term, which describes plant populations fitting formalised legal criteria.

#### *Kultursaat e. V.*

**Kultursaat** is an organic breeders' association, founded in 1994. Its almost 400 members are mainly based in Germany, but also other German-speaking countries such as Switzerland and the Netherlands. They breed vegetables, herbs and flowers for commercial farmers and hobby gardeners. Kultursaat's aim is to develop varieties which are organic from start to finish and fill the current void of vegetable varieties suitable for organic agriculture. They are convinced that seeds are cultural goods, stemming from the voluntary work of generations of farmers before them and hence, should be maintained in a way that keeps farmers' and breeders' rights intact. They do so by waiving private property rights to the varieties they breed, inviting farmers to seed save or breed themselves.

Germany has a temperate climate with well-distributed rainfalls. It is maritime in the north and continental to alpine in the south. Soils are mostly fertile to very fertile. All in all, conditions are ideal for farming (Barkin, 2022). Exceptions are marshes in the north and the country's mountainous regions, which are used for grazing (ibid.).

Agriculture amounts to about 1 % of the German economy (Ahrens, 2021a). Farms are commercial farms; subsistence agriculture plays no role except as a hobby. Agricultural systems are still somewhat different in the German west and east, due to the post second world war split of the country. Eastern German

farms are usually larger in size, a remnant of Communist centralisation politics. Western Germany essentially keeps family farm structures, though these farms also grow in size, as farmers try to gain acreage (Barkin, 2022). Three quarters of farmers have given up their farms in the past 60 years, and less than 3% of the population is currently employed in agriculture (ibid.). The country's self-sufficiency rate is almost 90 % as of 2020 (Ahrens, 2021b).

In 2020, about 10% of agricultural land was organically farmed, distributed across 10% of farmers (Wilke, 2021). Organic agriculture is steadily on the rise and supported by politics. Germany's goal for 2030 is to increase organic farming to 20%, as fixed in the German Future Strategy for Organic Farming (BMEL, 2022). The current government is aiming even higher, at 30% for the same timeframe (ibid.). German farming is in line with and substantially influenced by EU regulations and politics, similar to its seed system described in chapter 2.3 *Of Seeds and Humans*.

Kultursaat originated from an initiative group for biodynamically<sup>146</sup> produced seeds, which started with a collective of Demeter organic farmers in 1985. They formalised into the association known as Kultursaat in 1994 (Kultursaat e. V., 2022a). Of Kultursaat's 400 members, 30 take on breeding responsibilities.

Kultursaat aims to preserve proven vegetable varieties, breed novel varieties, promote transparent breeding knowledge, and further breeding research (Kultursaat e. V., 2022b). Since being founded, the association has registered over 100 new varieties with the German Plant Variety Office, with 18 further varieties currently under review (Kultursaat e. V., 2022c). In addition, it is responsible for the conservancy breeding of 19 further varieties, not originally bred, but maintained by the association (Kultursaat e. V., 2022a). Seeds are sold via organic seed trading partners, mainly the company Bingenheimer Saatgut AG.<sup>147</sup> While Kultursaat receives 'breeding contributions' from their seed trading partners as remuneration, the bulk of the association's funding for breeding stems from foundations and private donations, as well as research grants (Sievers-Glotzbach et al., 2020).

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146 A strict form of organic agriculture. They organise under the Demeter organic label.

147 While Kultursaat e. V. and the Bingenheimer Saatgut AG are two separate entities, they have been founded by a similar group of people and focus their efforts cooperatively. Keeping the organisation separate has organisational benefits and ensures independent and less profit-sensitive breeding, as well as, most importantly, non-privatisation of seeds.

Kultursaat's organisational structure is simple (see *Figure 14*), compared to MASIPAG's. Active members of the association are horticultural entrepreneurs and independent breeders who regularly deliberate and adjust their breeding efforts as a group. Self-governance is important to them, so they work as a decentralised network and hierarchies are flat (Sievers-Glotzbach et al., 2020). As a registered charitable association, Kultursaat elects a 5-person executive board every 3 years. Their main job is application of the statutes, particularly budget and cash management, external representation and development of the association's structure for the overall success of Kultursaat activities.

All members meet semiannually to discuss organisational, strategic and political issues regarding the association. These community meetings are the prime decision-making bodies. A feature is that they are open not only to members of the association, but all interested outsiders as well (they do not get to vote). Besides discussions on the steering of the organisation, they also include working group reports and breeding workshops. Additionally, throughout the year, smaller groups of breeders involved with specific vegetables self-organise meetings to discuss their specific breeding efforts and research findings. For example, there is one group focused on beetroot, while another has its main interest in kale.

Breeders can be understood as farmer-breeders, even if slightly different to MASIPAG's definition. All Kultursaat's breeders run commercial organic<sup>148</sup> farms, often creating their main incomes from vegetable sales rather than variety development. They breed on-farm and routinely swap seeds with their peers to have them tried out in different climates, enable local adaptation and test resilience. At the same time, however, seeds are economic goods for Kultursaat's farmer-breeders, as they are ultimately contracted to organic seed companies for multiplication and sale.

The described practices are in line with the association's core values of community, transparency, autonomy and responsibility towards ecosystems and the cultural heritage of plant diversity (Kultursaat e.V. 2018).

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148 More precisely, biodynamic farms.

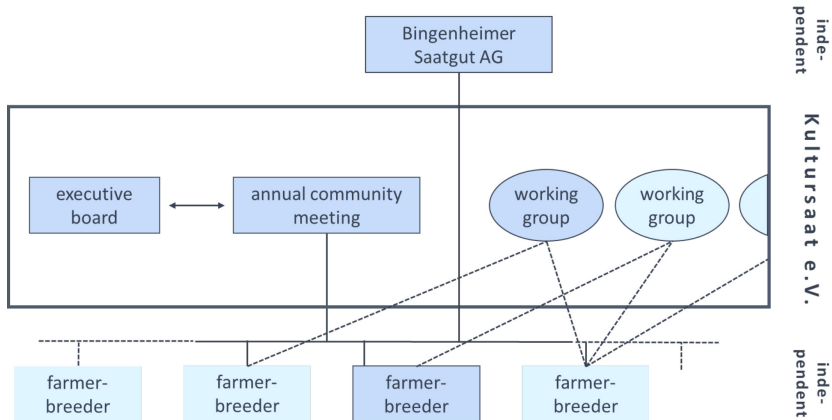


Figure 14: Kultursaat e. V.'s structure. Source: Own depiction based on two years of participation in the association's bi-annual meetings

These values are mirrored in their breeding goals, which aim at organically bred, biodiverse and locally adapted varieties with “excellent inner quality” (Kultursaat e.V. 2018; personal note from Kultursaat’s coordinator). High yields are a secondary criterion, but farmer-breeders are careful to ensure the suitability of their varieties for vegetable growers’ and gardeners’ needs, a task that is simplified by them running farms themselves. Farmer sovereignty is also considered in organic breeding itself: it ensures farmers’ biological accessibility of seeds for seed saving. Any breeding techniques which impede seed stability and reproducibility are rejected, as are technical intrusions into plants, their cells, or their genes, for breeding. This leaves Kultursaat’s breeders with selection, crossbreeding and population breeding techniques (see chapter 2.3 *Of Seeds and Humans* and *Appendix D: Breeding Methods – An Overview*). Kultursaat explicitly encourages farmers (their end customers) to seed save and hence uses no breeding or legal techniques which impact this seed practice in any way.

Kultursaat openly shares most information on their breeding, including parent varieties, breeding process and selection criteria. Their knowledge is also shared in a formal two-year breeding training program which is offered by the association to farmers, apprentices and interested others without charge.

Commons logics and principles are ingrained in Kultursaat’s values. As mentioned above, they have implications for the breeding process, the legal

arrangements and the organisational structure of the initiative. First and foremost, seeds should remain open to farmers, so Kultursaat does not claim variety protection (Sievers-Glotzbach et al., 2021). The varieties are registered to Kultursaat as a non-profit organisation, so varieties cannot be privatised by others; seeds of those varieties are marketed privately, but the varieties cannot be co-opted. Through their ongoing critique of the rigid DUS criteria for variety registration, they are now sometimes consulted by German and European lawmakers to find options for seed alternatives to remain possible.

Breeders believe that current farmers are responsible for preserving and developing biodiversity for future societies to be able to feed themselves. This is only possible if seeds can be used freely by farmers (Sievers-Glotzbach et al., 2020). Progressive commons' values of social-ecological sustainability and sovereignty are found in this statement.

### *Summary of case studies*

To help understand the organisations' interpretation of the capabilities in the following chapter, here is a summary of the surrounding environmental and social contexts of MASIPAG and Kultursaat e. V.

In the Philippines, farmer-breeders work in several distinct climatic zones. Recurring natural calamities are a given in the archipelago and range from drought and earthquakes to flooding, typhoons and saltwater intrusion, depending on the region. Socially, farmer poverty is widespread and may even mean insufficient food produce or income generation to buy food from the markets for their families. Food security therefore is a concern for many small-scale farmers. Frequently, insufficient income or savings result in payment schemes where farmers take up loans from seed traders at the beginning of a season, who can then determine prices after harvest. Farmers are in a weak bargaining position in these schemes and report psychological pressure (according to interviews with the coordinator) from fearing an inability to pay back their loan each season.

Kultursaat works in temperate climate zones in middle Europe. While weather is comparably modest, weather extremes due to climate change become more frequent. Socially, farmer-breeders have sufficient income from their commercial farms and are backed by their countries' social security schemes, if need be. As organic farmers, though, they experience a lack of suitable varieties specifically bred to the needs of organic agriculture. Furthermore, legal and biological enclosures of seeds are increasing, and they fear for the continuation of farmer sovereignty and breeders' rights. Their conviction is that seeds and



agrobiodiversity are cultural goods, which need to be preserved and kept openly accessible for future generations of farmers.

Having been introduced to the research subjects in some depth now, the findings are presented.

## 5 Findings

This chapter presents answers from the interviews starting with capability one, *control over one's economic future*, and ending at capability eleven, *beauty in life*. The findings describe which answers were given to the individual capability questions, which themes repeat in farmer-breeders' answers and are broadly divided into replies from MASIPAG and Kultursaat. Two capabilities, which emerged inductively from the interviews were added afterwards: *living in and with concern for community* and *working for a human(e) future*. For each capability, responses of MASIPAG's farmer-breeders are summed up first, followed by those of Kultursaat e. V.'s breeders.<sup>149</sup> Last but not least, answers from both organisations are compared regarding their interpretation of the capabilities and which aspects they emphasise.

### Capability 1: control over one's economic future

The first capability taken up in the interviews is *capability 1: control over one's economic future*. Its central points, as described previously in chapter 3.2 *The Capability Approach for Seed Commons*, are:<sup>150</sup> To be able to control one's production, actors need **access to** and **sovereignty over** their means of production and the knowledge to work with them, as well as choice as to which they prefer.<sup>151</sup> These are also two steps in which the findings are presented.

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149 Interviews are cited in following code: abbreviation of organisation (MAS = MASIPAG; KS = Kultursaat e. V.), followed by the person (FB1-X for anonymised farmer-breeder interviews in both organisations, ST1-X for staff of MASIPAG and CM / CP for the (former) coordinators of MASIPAG), concluded by the line number of the quote in the qualitative research software MaxQDA. For the MASIPAG coordinators, there are two interviews each, so they are listed in the format CM1 / CM2. For example: *MAS CP2: 71*.

A list of anonymised interviews can be found in chapter Research Methods, Data Collection and Analysis, p. 112.

150 The full description of the capability is in chapter 3.2 *The Capability Approach for Seed Commons*.

151 This is context specific. For small-scale farmers in circumstances of scarcity in particular, access to affordable and diverse seeds is key, as own produce is the prime source of sustenance. Farmer-breeders in affluence are concerned for the long-term sustainability of crop production in general.

## *MASIPAG*

The interviewed members of MASIPAG can all relate to gaining control over one's economic future through seed commons. Their main concerns for economic security are independence and food security. Gaining economic control is the network's core idea, as its former coordinator describes: "the daily decision about farming and marketing enable[s] farmers to reassert control over their production system" (MAS CM2: 26).

**Access** to seeds is achieved by farmers through decentralised multiplication and storage of seeds on-farm (MAS FB7/FB8; MAS CM2; MAS FB3/FB4; MAS FB5/FB6; MAS ST2; MAS FB1/FB2). Farmers maintain several varieties and multiply them proactively, producing spare seeds for the next season or unforeseen natural calamities (MAS FB3/FB4; MAS FB7/FB8). "By using MASIPAG seeds [farmers] use free seeds. So they don't need to buy them." (MAS ST1). Long-term seed access is secured by heeding MASIPAG's seed maintenance and sharing practices (MAS ST2).

In addition to access through seed saving, farmers access MASIPAG's variety pool. They request tablespoon quantities of rice varieties from the BUF whenever they need replacement or want to try something new (MAS CM1; MAS ST1). In this way, farmers find seeds with specific characteristics (e.g., resilience against drought or lodging, affordability, suitability to organic farming practices) and are not restricted by the insufficient variety choice in their local markets (MAS FB7/FB8; MAS FB1/FB2; MAS FB5/FB6).

Access to formal and informal knowledge,<sup>152</sup> helps farmers to master diversified organic farming and achieve resilience (MAS CM1; MAS FB7/FB8; MAS FB3/FB4), as well as tackle other "usual problems encountered by the farmers" (MAS ST1: 142). Access to both seeds and organic farming knowledge lets farmers produce all farming inputs on farm and therefore farm virtually without costs (MAS ST2; MAS ST1). This provides food security.

Two more accessible resources are mentioned. By joining MASIPAG, farmers join a community (their PO) and gain access to community help (called *Baya Nihan*; MAS FB3/FB4). Also, via their POs, farmers can associate with local and national institutions (MAS ST2), such as the *Carabao*<sup>153</sup> Center or the Social Action Foundation, and access the benefits of these networks.

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152 See capability 3: sharing of seed knowledge, for more details.

153 Tagalog for buffalo.

It is emphasised that access to means of production needs to go hand in hand with control (MAS CM2; MAS CP2; MAS ST2) and be ensured long-term (MAS CM2; MAS FB3/FB4; MAS ST2). Long-term control is synonymous with sovereignty, the second aspect of capability 1.

**Sovereignty** over seeds is referred to by MASIPAG's coordinators and staff as seeds in the farmers' hands (MAS ST2; MAS CP2; MAS CM1). This notion implies several seed practices: It means that farmers have varieties on their farms which are theirs<sup>154</sup>, which they can multiply as much and as often as they like, choose from without constraints (e.g. financial), and model to their needs by breeding. Let's look at each of these more carefully.

- Farmers report being active in the network as motivational, to “have my own seeds and not depend on seed companies” (MAS FB5/FB6: 272 ff.; also, MAS FB3/FB4; MAS FB7/FB8; MAS ST1). This independence is not an abstract wish or a possible future concern, but a liberation from existing market dependencies: “MASIPAG seeds are seeds of liberation. [...] Why? Because you don't buy seeds.” (MAS FB1/FB2: 336). In addition to free access to seeds, farmers gain leverage in their seed sales: “Because we control the seeds, we don't need to defend our next cropping to the corporation [...] we are able to define a proper price for our production” (MAS FB3/FB4: 243; see also MAS CM1&2).
- Farmers multiply MASIPAG's seeds as much and often as they like (MAS FB7/FB8; MAS CP2; MAS CM1; MAS FB3/FB4; MAS FB1/FB2; MAS ST2). “MASIPAG small-scale farmers are no longer chained to conventional technologies” (MAS FB1/FB2: 336). Instead of hybrids, farmers' seeds are open pollinating<sup>155</sup>, a prerequisite for farmer-controlled seeds (MAS CM1; MAS CP2; MAS CM1). Besides multiplying on-farm, farmers ensure their independence through seed sharing. “[W]hat's being encouraged is to sell rice, processed rice. Not the seeds. Seeds are for sharing.”

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154 Or, more precisely, cannot legally be taken from them. Seeds available on the markets are usually hybrid varieties registered to companies who have the right to restrict the use of their genetic property with contracts upon sale. MASIPAG's varieties do not belong to single farmers or even the network. They belong to no-one; they are an open common accessible to anyone regarding their genetic information. When varieties are bred by a MASIPAG farmer-breeder, “the seed is considered owned by the farmers throughout the Philippines” (MAS ST2: 264). However, they are physically kept and maintained by MASIPAG and, decentrally, by all their individual farmers.

155 A reminder from the chapter on seeds: Open pollinating seeds are genetically stable over several generations and saved seeds exhibit the same characteristics as their parents. More on this in chapter 2.3 *Of Seeds and Humans* and in *Appendix D: Breeding Methods – An Overview*

(MAS FB7/FB8: 256). A sharing culture ensures a broad and healthy genetic pool and backup seeds across the country, should some get lost on a farm or in a region (MAS FB3/FB4)<sup>156</sup>. Some farmers are motivated to maintain many varieties to be able to provide seeds to their neighbours (MAS FB5/FB6).

- The farmers choose seeds which fit their needs (MAS CP2; MAS FB7/FB8): financially (MAS FB1/FB2; MAS FB7/FB8; MAS ST1), in their suitability for organic farming (MAS FB5/FB6), resilience (MAS FB5/FB6; MAS ST1) and regional adaption (MAS ST1; MAS FB5/FB6).
- Breeding is an option for farmers to create seeds according to their needs (MAS CM1). Some general guidelines: “when I do breeding, I would always think of a variety with high yield, [which is] locally adapted, pest tolerant and not dependent on chemicals” (MAS FB5/FB6: 259).

Besides freedom of seed practices, sovereignty for MASIPAG’s members means to “reassert control over their production system” (MAS CM2: 26) in general. They are empowered to do so by three means (MAS CM2): first, controlling farming inputs. Second, gaining knowledge. And third, taking full responsibility for their farming.

- Farmers enjoy seed sovereignty, as described above. They also control all their other farming inputs, such as organic fertilizers and pesticides (MAS ST1), which they manufacture on-farm.
- To do so, they require intricate knowledge in production, organisation and technology. Farmers attend MASIPAG trainings, build and maintain trial farms in their POs and constantly engage in knowledge sharing. Findings for *capability 3: sharing of (seed) knowledge*, describe this in detail.
- As a third step, farmers become sovereign by taking responsibility, or as it is put, by taking “ownership of the development activity” (MAS CM1: 80). Farmers gain independence by “relying on ourselves rather than everything else” (MAS FB3/FB4: 239).

As an outcome, farmers emphasise higher income and increased financial security (MAS CP2; MAS ST2; MAS CM2). A staff member (MAS ST1) mentions a study by Bachmann et al. (2009), which shows higher revenue for

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156 Implementing a sharing culture is obvious for the network, as this quote by one of their staff shows: “Of course, most of the farmers, especially Filipino farmers, have an idea of sharing. They always have an attitude of sharing the seeds. Like for example, if I am a farmer and you are a farmer and I asking for your seeds then yes, they always have an attitude of sharing of seeds.” (MAS ST1: 85).

MASIPAG's farmers than conventional and non-organised organic small-scale farmers in the Philippines. Farmers achieve additional surplus through value chain integration, namely processing their own rice and direct marketing it via their PO (MAS CP2). Additional financial security is achieved through diversified farming, serving double as a "bank in the backyard" (MAS CM2: 8). Farmers usually raise animals they can sell in financial tight spots:

"When there is a typhoon and the family has no money, they sell the chicken or other livestock. Then they have some money for their children to go to school, to pay for the tricycle or other transportation, or to buy snacks and lunch there. If they need money for tuition fees, they sell the pig or the goat. If someone gets seriously ill, they sell the carabao [Tagalog for buffalo]" (MAS CM2: 28 ff.).

The network is **not always successful** in facilitating capability 1 for their members. The coordinator reports that, in rare instances, group cohesion within POs fails and few, comparably better off members, prioritise their self-interest before group goals (MAS CP2). This decreases the control over their economic future for the other members of the PO.

"[It is] economism. [...] You don't care about the other farmers. [...] The organisation will self-destruct if that is the mindset of the leading members of that organisation." (MAS CP2: 82).

A second aspect they mention as a barrier to achieving long-term seed sovereignty, is farmers' breeding efforts (MAS CP2). Of the 7,000 members, only about 10 are currently active farmer-breeders. They ascribe this to MASIPAG's vast seed collection that lets farmers find varieties suitable (enough) for their needs to refrain from investing efforts into breeding.

Several aspects the interviewees mention **go further than the definition of the capability**. While I only ask about seeds (questions being 'How does working with MASIPAG's seeds influence your income? How does it impact your control over your economic future?'), the responses of the network's members include access to and sovereignty over other factors of production, as well as knowledge and social organisation. I include these mentions in the findings above, although they, strictly speaking, are already a broadening of the capability.

Practices of community and social organisation come up as prerequisites for the functioning of the network's practices (MAS CM1; MAS CP2; MAS FB3/ FB4):

"If they [the farmers] want to be free from corporate control they must pursue organic agriculture. They must start organising themselves, so they can collectively maintain their own trial farm or community seed farm, because it's very difficult as an individual" (MAS CP2: 20).

Also, social organisation leads to general farmers' resilience (MAS CM1):

“If you teach me to organise, then whatever the challenge or the problem is, I can join together with my peers [...] and we will develop our own solutions. That's empowerment and the role of organisation.” (MAS CM2: 10).

Farmers describe community aspects in community help (MAS FB3/FB4; MAS FB5/FB6) and information sharing between farmers (MAS FB3/FB4). Social organisation hence seems less like an overlooked addition to this capability and more as one in its own right, which is why it is added as *capability 12: living in and with concern for community*.

### *Kultursaat e. V.*

For Kultursaat members, **access** to seeds means access to the right seeds: organically produced, open-pollinating varieties which show complex traits (KS FB2; KS FB6; KS FB8; KS FB9; KS FB10). For example, varieties which are resistant to outcomes of climate change and have high nutritional value for both body and spirit (KS FB5; KS FB7; they call it 'inner qualities'). It is a practical response to a shortage of suitable varieties for professional organic farming as well as a normative motivation.

For Kultursaat's breeders personally, control over their economic future describes their income via the association. They are independent contractors, who receive breeding or multiplication funding (KS FB1; KS FB2; KS FB3; KS FB4; KS FB5; KS FB6; KS FB10):

“Through this association [...] the continuity of breeding is relatively well represented. [...] Kultursaat provides a more long-term perspective, as they think in more long-term cycles and also the projects are modelled in a way that they can be finalised” (KS FB1: 6 ff.).<sup>157</sup>

A long-term economic perspective is thus attributed to the organisation as a community, and more formally an association (KS FB1; KS FB5; KS FB6). Few breeders rely on Kultursaat's breeding mandates as their primary or only source of income (it is like that for KS FB5 & KS FB6), most primarily farm vegetables, and breed in addition. “[Breeding] always was, and is up until today, a small part of my aggregate economic activity” (KS FB2: 11; also KS FB9; KS FB8). Some interview partners are employed on farms full-time and breeding or seed multiplication is part of their job (KS FB4; KS FB10). In these cases, Kultursaat's seed commons are decoupled from their personal

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157 Translations of quotes from German to English by the author.

economic security. All in all, access to funding of breeding and seed multiplication contributes to members' capabilities in substantially varying degrees.

Access to other factors of production and knowledge is not mentioned by the interview partners in the context of economic control.

The aspect of **sovereignty** is mentioned in two ways. First, as an artisanal fascination: "It was clear to me that that [seed production and breeding] is part of producing vegetables" (KS FB2: 11). Second, the association holds the value that *seeds are common goods*, which means that farmers should both have long-term sovereignty over seeds and are responsible for maintaining them (KS FB5). Kultursaat's members want to breed quality varieties for (organic) farmers to use with no limitations regarding seed practices (KS FB1; KS FB2; KS FB6; KS FB8; KS FB9) and offer an alternative to dependence on corporations (KS FB2). This is done by waiving private property rights. One breeder points out, however, that this is of little importance for vegetable seeds, as they are time consuming to seed save on farm (KS FB3). It is more relevant for grains, such as wheat or rye, but the association does not breed those.

**Critical aspects** of this capability are voiced in two broad ways: on the one hand, the formulation of this capability applies only inconsistently with some of the association's members (conceptual critique). For example, if they are employed and do not run their own farm (KS FB4; KS FB10; KS FB3).

It also only applies to a limited extent because most members' primary income is farming, not breeding. And for farming, seeds are bought, even the ones once bred by the association (KS FB8; KS FB9). Here the structure of the German vegetable market and multiplication characteristics of vegetables come into play. Even if members breed or multiply a few vegetable varieties on-farm, it is too time consuming to produce all seeds themselves (KS FB3). Also, seed price is not a central economic factor for vegetable farming in Germany (KS FB8). Hence, the open pollinating varieties created through Kultursaat's seed commons do not have a direct economic impact on its members.

On the contrary, a practical observation is that seed commons create a more challenging economic environment for breeders and farmers. Income from breeding and farming with open pollinating varieties is comparably smaller (when held against breeding for a company or organic farming with hybrids) or fewer hours are compensated for than are performed (KS FB10; KS FB6). Sometimes this occurs willingly: "Because we know that our breeding efforts are paid for by donations, we never report all hours we work and all costs that we have" (KS FB6: 9). Open pollinating varieties achieve less yield than



hybrids (KS FB8; KS FB9) and markets inadequately compensate for it in price:

“We use open pollinating varieties, because we are completely behind the idea and then we try other ways, through communication in marketing, to sometimes get a bit higher price for them. Sometimes we succeed, sometimes not” (KS FB8: 28).

All in all, breeding and using open pollinating varieties in Germany is mainly a question of values and ideals.

Kultursaat’s members also mention **aspects which further the capability definition**. Again, a recurring theme is community as the centrepiece and facilitation tool for seed commons practices. In this case, the association (community) grants a long-term economic perspective for independent breeders, which they could otherwise not obtain (KS FB1; KS FB5).

Another economic specialty is that breeding is financed by donations (KS FB7; KS FB6; KS FB9). One member explains that, as open pollinating varieties are bred for farming resilience on the verge of climate change, breeding them is a “task for society” (KS FB7: 13) and its funding by the public through donations, only logical. Funding through foundations is also important because experience shows that even farmers educated on the importance of independent organic breeding are reluctant to finance breeding voluntarily (KS FB3).

### *Findings for both organisations*

For both MASIPAG and Kultursaat, capabilities are entwined. MASIPAG’s members **link to other capabilities**. A threefold link to *capability 3: sharing of (seed) knowledge*, is drawn (MAS ST1; MAS FB3/FB4; MAS FB5/FB6), by referring to MASIPAG’s training, sharing culture and fostering of organic farming knowledge in general. *Participation in political decisions (capability 2)* is mentioned by the former coordinator when saying that opposing the status quo by alternative practices is a political action (MAS CM2), and also one of the staff, describing how POs network with other local and national institutions and NGOs (MAS ST2). Links to the capabilities of creativity and critical thinking (MAS FB3/FB4; *capability 5*), physical (MAS CM2; MAS ST2; MAS CP2; MAS FB5/FB6; *capability 6*)<sup>158</sup> and psychological health (MAS CP2;

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158 Farmers have sufficient (MAS ST2) and organic food available for themselves (MAS CP2; MAS FB5/FB6) and their community (MAS FB5/FB6). This cuts medical costs and keeps farmers in good health for work, contributing to economic security.

*capability 7*)<sup>159</sup>, support and respect (MAS ST2; *capability 8*), connection to plants (MAS CP2; *capability 9*), and spirituality (MAS FB3/FB4; *capability 10*) are all mentioned. Both Kultursaat and MASIPAG emphasise community aspects, which link to the novel *capability 12: living in and with concern for community* (KS FB1; KS FB5; MAS FB5/FB6; MAS CM1; MAS CP2; MAS FB3/FB4).

## Capability 2: participation in political decisions

The capability on participation in political decisions looks at how actors are able to participate in politics which influence their lives, especially concerning seeds, farming, and breeding. This includes **formal and informal possibilities for political influence**, which structure the findings. The capability description includes power to participate in political decisions and regulations regarding seeds and varieties. It also includes the ability to shape one's direct surrounding through informal practices. The final facet is the connection of political power and organisational membership.

### MASIPAG

MASIPAG is a large network and engages in **formal political activities** on a national level. An example is the network's presence on the Philippine's national organic advisory board (MAS ST2). The network sends representatives, but every member indirectly "contributes [to formal politics] by way of sending their representative" (MAS ST2: 283).<sup>160</sup>

**Informal political influence**<sup>161</sup> farmer-breeders' experience is split into informal political influence by the network as a unit, and farmers' network-internal influence. Getting farmers politically involved is a goal of MASIPAG.

"All the peasants who just want to improve their livelihood, economically, we must at the same time politicise them. So that they can engage with the government [...] for the betterment of farmers as a sector. Not as individuals, not as an organisation but as a sector. They must defend their sector." (MAS CP2: 86; similar in MAS CM2)

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159 Another oblique aspect the members report within this capability is the access to a positive outlook about their farm and faith in the future, which MASIPAG farmers gain by knowing they keep access to means of production long-term (MAS CP2).

160 More of these activities are mentioned during our research stay in 2019. However, in the interviews this is the only formal political activity mentioned.

161 Informal political influence describes practices of influencing local and national politics without formally engaging in them within a party. Examples are demonstrations, rallies, lobbying, or making use of local governmental consultation hours.

Farmers' engagement with local governmental bodies creates direct positive influence for regional farmers and communities (MAS CM2). POs can have (political) partnerships with other organisations (MAS ST2) and are encouraged to seek support from local governmental agencies (MAS ST2). Using MASIPAG's name helps farmers in their political endeavours, because organisations are more influential than individuals and have a bigger voice (MAS CM2).

Examples of local political influence include collaboration and critique. One farmer says that members of his PO are more likely than conventional farmers to report anomalies like new pests or insects to the local Department of Agriculture, because MASIPAG trains for critical observation of their farms (MAS FB3/FB4). They explain that reporting such things, asking for help or confronting local politicians about their agricultural plans, is made more likely through the confidence the network instils in its members, that they are knowledgeable about farming (MAS FB3/FB4).

On national and international levels, the network's (former) coordinators emphasise that the network has two general political goals: to support the organic agriculture movement (MAS CP2; MAS CM2), and to oppose the usage of genetically modified organisms (GMO's) in agriculture (MAS CM2). MASIPAG is slowly being transformed into an organic agriculture movement (MAS CP2), killing two birds with one stone: promoting organic agriculture means cutting common ground for GMOs (MAS CM2). In practice the network organises campaigns (MAS CP2), has encouraged its members to uproot GMO fields in the past (MAS CP2), and supplies land reform groups<sup>162</sup> with seeds and trainings (MAS CP2).

A facet of political power that goes **further than the capability definition** is that farmers also experience **network-internal influence** as relevant. MASIPAG is farmer-led and democratic (MAS FB3/FB4; MAS FB5/FB6; MAS FB7/FB8; MAS ST1; MAS ST2). Ideas are discussed both bottom-up and top-down, e.g., from PO to PCB and back (MAS FB1/FB2; MAS ST1). Members feel that their opinion gets acknowledged within the network (MAS FB1/FB2; MAS FB3/FB4; MAS FB7/FB8).<sup>163</sup>

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162 Groups engaging in 'agrarian land reform' repossess farmland, which is a long-time struggle on the Philippines.

163 Two quotes to illustrate this: "The plans are coordinated. The POs do assessment and planning as well [as the PCBs]. The plans go to the PCB and then the PCB discusses about them and brings them back to the PO for implementation" (MAS FB1/FB2: 228).

"Farmers, who are represented in every stage and the structure of MASIPAG see to it that farmers always have the greater number of votes<sup>163</sup>" (MAS FB3/FB4: 256).

It is mentioned above that within the network, the political is understood as holding and exercising power, not necessarily *power over* someone, but *power to* do something. Hence, practicing organic agriculture and sovereignty over seeds by creating an alternative seed system are seen as political activities in themselves (MAS CP2).<sup>164</sup>

“The practice of organic agriculture is already an expression of their desire to get out of the system of control that transnational corporations have established. That’s already a political statement.” (MAS CP2: 88)

“Through their cultivation practices farmers with little obvious powers can form an effective movement. Meaning, if they decide not to pay (for) the seeds, because they have their own seeds that will be a reduction to the sales [for corporations]. [...] The farmers don’t fight them, they just have to choose we have our own seeds. We are independent and autonomous” (MAS CM2: 28)

As a **critical remark**, the coordinator stresses a balance of political and economic motives, with economic security as more important. If “they are too political then they forget about the economic sustainability of their organisation” (MAS CP2: 82). In order to keep MASIPAG thriving, the basic needs of the members must be met before political actions can be taken. In praxis, however, it mostly goes hand in hand.

### *Kultursaat e. V.*

Kultursaat’s members speak of the association as a breeder network, not a political institution and mention **no formal political motives**. Nonetheless, they view their actions as **informally political**. The association takes part in alternative movements<sup>165</sup> and informs society of agricultural sustainability challenges. Each member’s interests are amplified through Kultursaat’s bundled voice (KS FB7). Kultursaat’s organic breeding practice offers a (missing) part of the organic food movement in providing varieties which are in line with organic values. As that gets more societal attention, one member envisions that organic breeding will be more influential for political decisions in the future (KS FB9). The association’s breeders are perceived as experts for organic

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164 This point could as well be sorted under informal political influence. As members describe it less as influencing formal politics and more as counteracting economic actors, I have decided to list it here.

165 This information is not given in the interviews but taken from minutes of association meetings. For example, it actively participates in larger organic organisations like IFOAM.

breeding and critique of GMOs. They are invited to talk on local panels or give interviews for research (KS FB1).

Through their work in Kultursaat, farmer-breeders report becoming more critical towards power imbalances and autonomy in the food production system (KS FB4; KS FB5). Organic breeding contributes to a self-determined society regarding agriculture (KS FB4).

Kultursaat's most striking political action is creating a viable alternative to the current Western European seed market<sup>166</sup> (KS FB7), a decentralised and independent seed system (KS FB8). The breeding process, the varieties stemming from this breeding, the independent financing, and the decision for common property – are all political. Choosing to affiliate with Kultursaat as an independent breeder instead of working for a conventional seed company (with fixed, higher salaries and technical breeding options) is a political decision based on core values (KS FB6; KS FB10). Independent financing ensures its normative and creative freedom (KS FB3) and fits Kultursaat's values, as the society as a whole indirectly finances their efforts. By legally keeping their varieties common property, farmer-breeders step into a tradition of breeding as volunteer work done by generations of farmers before (KS FB2).

Interviewees do not mention **association-internal political influence**. As described before, the network has a bottom-up, direct-democratic approach. Members do not refer to this as political influence, though.

No **critical remarks** are made by Kultursaat's farmer-breeders for this capability.

### *Findings for both organisations*

Being able to exert political influence **links to other capabilities**. MASIPAG's coordinator and staff make a connection to economic sovereignty (*capability 1*). By empowering farmers to jointly develop all farming and breeding technology they need, they become independent from seed companies, which is a political, anti-commodification statement (MAS CM2). The network's farmers voice mutual support and respect (*capability 8*) towards local political bodies (MAS FB3/FB4; MAS ST2).

Both MASIPAG and Kultursaat members connect their political capability to knowledge sharing (*capability 3*; KS FB1; MAS CP2; MAS CM2). For exam-

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166 As described in chapter 2.3 *Of Seeds and Humans*.

ple, by encouraging farmers to share knowledge necessary to build a seed system alternative (MAS CM2) – but also through farmer-breeders sharing their expert, organic agriculture and alternative breeding knowledge with external farmers or society (MAS CP2; KS FB1). Finally, interviewees connect their political force, or their becoming political in the first place, to being formally or informally encouraged to think critically (*capability 5*) within their organisations (KS FB5; KS FB4; MAS CP2).

### Capability 3: sharing of (seed) knowledge

‘How do you give and receive knowledge working with seed commons?’ is the question posed in capability 3. It is broadly defined as the possibility of actors to understand the world around them to enable them to effectively interact with it. While the interview question only asks about sharing of existing knowledge, which means giving knowledge and gaining it from others, answers entail production of knowledge as well. Receiving knowledge can then have two sources: gaining knowledge from training, others or literature and producing it as an individual or community. Taking this into account, results are presented roughly in these three categories: (1) **gaining**, (2) **producing** and (3) **sharing knowledge** about seeds, seed commons, and the crafts of organic farming and breeding in general. To learn more about the kind of knowledge, it is defined as formal or informal.

#### MASIPAG

MASIPAG’s farmers **gain knowledge**, both formally and informally from their participation in the network. Sources of knowledge gain they mention are:

- MASIPAG’s training (e.g., MAS ST1; MAS ST2)
- Network internal meetings, e.g., the PCB (informal knowledge; MAS ST1; MAS FB5/FB6)
- Trial farms (MAS CP2)
- Invitation of experts (MAS CP2) and partnering organisations (formal knowledge), such as *RightSeeds* (MAS FB3/FB4)
- Literature published by MASIPAG (formal knowledge; MAS FB5/FB6)<sup>167</sup>

Interviewees lay special emphasis on training (MAS CP2; MAS FB7/FB8; MAS ST2; MAS ST1; MAS FB5/FB6), MASIPAG’s main, formal source of

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<sup>167</sup> The network itself (organisational level) gains knowledge by collecting and documenting farmers’ invented technologies (MAS FB3/FB4). However, for the findings of this thesis, only the individual level is relevant.

knowledge transmittance. The goal of the network's training is to professionalise or "develop" (MAS CP2: 28) farmers. MASIPAG provides training on diversified and integrated farming (MAS CM1; MAS ST1; MAS ST2; MAS FB1/FB2; MAS FB7/FB8), community marketing (MAS CP2), breeding, and climate change resilience (MAS ST1; MAS FB3/FB4)<sup>168</sup>. Training is modelled to farmers' needs (MAS ST2; MAS ST1) and tries to address any problem farmers usually face (MAS ST1). The network teaches traditional practices and comparably simple<sup>169</sup> knowledge that "can be easily adapted and replicated by farmers in their own farms" (MAS FB5/FB6: 316). MASIPAG's members call this *relevant* or *appropriate* knowledge<sup>170</sup> in the sense that it is responsive to farmer's needs (MAS CM2) and materials used for technical solutions are readily available to small scale farmers (MAS FB1/FB2; MAS ST1; MAS ST2; MAS CM2; MAS FB5/FB6).<sup>171</sup>

"Being a farmer-member, I learned many things from MASIPAG. Things that I didn't learn from school, especially technologies using resources that come from my own farm, [...] traditional practices rather than technologies that are inappropriate." (MAS FB1/FB2: 357)

Part of the relevance of knowledge is also that necessary knowledge links are kept intact. For example, seeds and practices are never considered separately. (MAS ST1). There is no gaining seeds without gaining knowledge or the other way around (MAS FB3/FB4). Beyond seeds and farming knowledge, farmers report learning about the wider environment they operate in as well. Global problems, such as climate change, are mentioned as well as the importance of community (MAS FB1/FB2).

As farmer-empowerment is central to MASIPAG, the network's formal knowledge transmission is conducted amongst peers, farmer to farmer. Advanced training includes developing farmers into farmer-trainers themselves (MAS CP2; MAS ST1).

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168 Contents of training programs are, for example, farming practices such as rotation cropping (MAS FB7/FB8) and the use of root crops as survivor crops of typhoons (MAS CM1).

169 Simple here means that the knowledge is applicable for farmers with the means and tools available to them. This knowledge might contain highly complex relations, like ecological cycles and functionings.

170 This knowledge is frequently referred to as *traditional practices* – even if some of these techniques are not traditional but were developed recently by MASIPAG farmers.

171 In contrast, company or governmental solutions are perceived to be ill-fitting or have a problematic focus on yield instead of income (MAS CP2; MAS CM2). "We focus on the relevant kind of knowledge generation that is not requiring much cost or capital. And that is the kind of knowledge that they [MASIPAG's farmers] get more than the non-members of MASIPAG" (MAS CM2: 52).

Informal knowledge gain is promoted by MASIPAG's principle of knowledge sharing and education goals. It, for example, takes place in meetings at various points of the network's structure or within farmer communities. Every meeting amongst farmers develops into an informal gain (and, as we will later see, also sharing and production) of further knowledge, be it a formal training or an organisational meeting. Knowledge transfer is not limited to MASIPAG-internal meetings: "MASIPAG [...] gave us the culture that wherever you go, [...] gather information, gather seeds" (MAS FB3/FB4). This practice includes encounters with non-MASIPAG and foreign farmers.

"MASIPAG members not only get, they develop knowledge" (MAS CM2: 52). The **production of knowledge** by farmers has an individual and a communal dimension.

Individually, farmers critically reflect received technology and modify it to their needs if necessary. Farmers apply gained knowledge in their farms repeatedly, observe its effects, identify possible improvements, and adapt accordingly. Thereby "they evolve through experimentation" (MAS CP2: 106) and produce new knowledge (MAS FB1/FB2; MAS FB3/FB4; MAS CP2). Different cultures of various POs lead to a range of experiments on which technology to use and how (MAS ST2). Applying this practice makes farmers active participants in technology generation. The direct link between gaining and experimenting with, and hence producing knowledge in MASIPAG is understood as farmer empowerment (MAS CM2).

Developed knowledge is documented by the farmers as new technology or best practice (MAS CP2; MAS FB3/FB4; MAS FB7/FB8) and checked by a scientific board in a constructive hearing to "give more substance to the technology" (MAS FB3/FB4: 194). The documentation is then available to other farmers for their further knowledge gain, as described above.

Knowledge is also produced in breeding (MAS CP2), which is carried out by farmer-breeders (MAS ST2). Breeding knowledge was successfully transferred from volunteering scientists to farmer-breeders, so the support of the former is no longer needed (MAS ST2). Even some farmers who do not breed, plan for breeding in the future by keeping possible parental lines intact (MAS FB1/FB2).

The communal dimension of knowledge production centres in the POs and their trial farms. The latter are seen as integral tools for continued learning (MAS CP2). They combine experimental learning and social organisation, which together result in resilience and farmer empowerment (MAS CM1).



Trial farms necessarily work through knowledge sharing and thereby link to the third aspect of this capability.

In many instances, right after mentioning the production of technology and practices, **sharing of knowledge** is emphasised (MAS FB1/FB2; MAS FB3/FB4; MAS FB7/FB8; MAS CP2; MAS ST2). Farmers share developed technologies, comment on and discuss them (MAS CP2; MAS FB1/FB2). Besides the formal knowledge sharing as farmer-trainers (MAS CP2), constant informal sharing is practiced:

“I think sharing of our seeds is the same as sharing of ideas. When farmers [...] talk to each other, they also share their different ideas on different matters.” (MAS ST1: 152).

Interviewees are matter-of-fact about sharing within MASIPAG and do not give details, besides that it is inevitable and constant. The coordinator explains: “[farmers] get more knowledge, because we cultivate sharing [...] with other farmers” (MAS CP2: 90). It becomes clear that *gaining* and *sharing* knowledge are linked.

Likewise, MASIPAG farmers are encouraged to experiment with and modify all knowledge they receive (MAS CM2; MAS FB1/FB2), so *gaining* knowledge leads to applying and modifying it, until it is beneficial and thereby *producing* knowledge.

**Critical remarks** are made on knowledge handling in the formal seed system, including government and universities: as agricultural success is solely measured in yield, knowledge given to farmers from these sources is accordingly narrow (MAS CM2). That is why knowledge relevance is stressed for the network.

As mentioned above, the **capability is furthered** in the aspect of knowledge production. It has been integrated into the above findings report, however, as it related to both gaining and sharing of knowledge, those links should not have been obscured by listing it here.

#### *Kultursaat e. V.*

In Kultursaat, both practical and theoretical (KS FB2; KS FB1), as well as formal and informal knowledge (KS FB7) are constantly **gained** through a variety of sources. Informal knowledge is the kind farmer-breeders refer to most.

Chiefly referenced for knowledge gaining is the network itself, with lively exchange between the breeders (KS FB5; KS FB2; KS FB8; KS FB9; KS FB7).

The association Kultursaat is smaller than the network around it, as any like-minded breeders and multipliers are welcome to Kultursaat's summer and winter events (KS FB2; KS FB9).<sup>172</sup> The effect is a close knit wider biodynamic breeding network. The long-term personal ties help for (informal) knowledge gaining, as breeders are aware of others' special expertise and experience and can ask when questions occur (KS FB5; KS FB2).<sup>173</sup> This not only holds true for breeding, but also marketing and propagation (KS FB8). An aspect of the association some members emphasise is also exchange about the anthroposophical understanding of plants (KS FB8; KS FB9), as well as gaining an understanding of the complexity of interdependencies between one's own farm work and global (sustainability) topics: "[seed commons] are a great example to make dependencies transparent, as well as the consequences of one's actions" (KS FB4: 16).

Another source of (informal) knowledge gain, is the social ties in the microcosmos of individual farms, both top-down, when learning practical vegetable farming and breeding from seasoned breeders as an employee (KS FB10), and bottom-up where farmer-breeders get knowledge from employees, for example, because they were previously trained as craftsmen (KS FB9). Also, knowledge from literature is mentioned (KS FB2).

Finally, plants are explicitly listed as (informal) teachers of (practical) knowledge, as breeders learn from them through their observations over the years (KS FB5; KS FB1; KS FB6):

"I gain knowledge or experience every year anew: how plants live together with the soil, with the environment, with us." (KS FB1: 22).

"Actually, always, when I am with my plants, I get new knowledge. Not always factually checkable knowledge. I get new experiences time and time again, which might condense to a form of knowledge in its repetition." (KS FB6: 17)

Knowledge is **produced** gradually. Thoughts about plants and breeding become richer every year (KS FB5; KS FB1; KS FB7), through actively involving oneself with plants and natural processes (KS FB1; KS FB10). What is

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172 One of the interviewees is formally employed at a small Swiss organic breeding initiative but has regularly been participating in Kultursaat's meetings for over a decade and is acknowledged as a close associate.

173 Of course, this location of particular knowledge and being able to ask for it could also be classified as *sharing* of knowledge.

described above as *gaining* knowledge from plants might just as well be seen as *producing* knowledge in interaction with plants.

Knowledge production is facilitated through breeders' freedom to determine their own focus (KS FB10). Individual, specific knowledge can thus be produced. A formal element of knowledge production is breeding reports breeders write and place at the disposal of the association (KS FB9). Those and any other information sources are critically discussed at breeders' meetings, which enhances and, again, produces knowledge (KS FB9; KS FB7). Knowledge production and sharing hence mix in Kultursaat's practices.

**Sharing knowledge** is cherished in the association. The biodynamic breeders are transparent about their work, even towards likeminded breeders outside the association (KS FB2; KS FB3; KS FB5; KS FB6; KS FB9). An interviewee formerly employed in a conventional breeding company emphasised this open sharing as both exceptional in professional breeding and fostering creativity (KS FB3). There is a feeling that giving and receiving practices balance each other and both need space in the association (KS FB8).

Some of this sharing is formalised. Mentioned before are the breeders' meetings (KS FB9; KS FB7), which marry formal and informal exchange. An example of formal exchange at those gatherings are the expert groups who meet on specific crops (KS FB7). But also marketing knowledge, supply chains and vegetable propagation are discussed on the side (KS FB8). Formal transfer of knowledge to the next generation is achieved through biodynamic farmer training (KS FB1; KS FB10) and breeder's training offered annually (KS FB9; KS FB1). One farm also offers tours and a display garden for visitors, with some plants only grown for that purpose (KS FB10). All this sharing produces knowledge as well; when teaching others, their continued questions encourage the teaching breeders to extend their own knowledge (KS FB2).

It is not only formal-professional knowledge that is included in the association's sharing culture, but breeders especially cherish the open sharing of niche biodynamic and anthroposophical knowledge, as well as personal motives and attitudes between each other (KS FB7; KS FB9; KS FB10). This happens mostly in informal sharing. Living one's individuality has high value in the association and engaging with strong-minded others fosters personal development (KS FB7; KS FB9). This is deemed positive, as it is also viewed as a prerequisite to sharing questions of sense with colleagues, like the role of humankind in nature and sustainability: "How do we want to live? What makes sense? What does the world need? What do we have to do to have a world that can exist sustainably?" (KS FB4: 14).

The breeders' **critical remarks** address both the conventional breeding system, as well as breeding-knowledge diffusion amongst farmers. In conventional breeding, knowledge is market power and liberal sharing is not possible. This creates a more restricted atmosphere in conventional breeding companies, where productive exchange between breeders of different companies is inhibited (KS FB3). Although the interviewee views this as restricting creativity, they marvel that those companies are highly innovative all the same (ibid.).

The second critical remark addresses a lack of breeding knowledge dispersion amongst farmers. A misconception has been spreading that plant breeding and seed production are difficult, because it is now done exclusively by a few highly technologised companies (KS FB6). As it is not, after all, that complicated, and achievable with home-gardening supplies, more farmers could attempt breeding and experiment with their own lines (ibid.).

**No furthering** of the capability is mentioned, besides, as explained above for MASIPAG, aspects of knowledge *production*.

#### *Findings for both organisations*

Knowledge sharing is **connected to other capabilities**, as it is a practice central to both organisations. MASIPAG members especially, describe it as being connected to various other capabilities. First of all, it is related to control over one's economic future (*capability 1*; MAS ST1; MAS FB3/FB4; MAS FB5/FB6). MASIPAG's training targets farmers' ecological and economic resilience, hence contributing to their economic security. Knowledge sharing between farmers has a similar effect. This network-learning also helps farmer-breeders to become better at their work (*capability 4*; KS FB5; MAS CP2; MAS FB7/FB8). Knowledge exchange about breeding is what helps Kultursaat's farmer-breeders to develop their creativity and critical thinking (*capability 5*; KS FB10; KS FB7). Breeders get new ideas and different outlooks from each other and can take this input back to their farms to experiment or reconsider their own views. In MASIPAG, farmers not only learn practices for seed sovereignty, but also an experimental and critical farmer-scientist outlook which they use to adapt technology and practices to their needs and develop their own (MAS ST1; MAS CM2). Most importantly, knowledge sharing is connected to giving and receiving support and respect for MASIPAG (*capability 8*; MAS CP2; MAS ST2; MAS FB5/FB6; MAS FB3/FB4). Converting to organic farming is described as feeling isolated and alone at first (MAS CP2), as it is not yet mainstream in the Philippines. There is a lack of understanding in rural communities for the goals of the experimenting farmers.

Being in a professional exchange with likeminded farmers through the network, helps them to stay determined (MAS CP2). Being the one to share self-developed or useful traditional knowledge, as well as self-bred lines, earns the respect of other farmers in MASIPAG, amongst one's community, and even from local authorities and governmental agencies (MAS CP2; MAS FB5/FB6; MAS FB3/FB4; MAS ST2). Two more capabilities are only briefly mentioned as being connected to knowledge sharing. One farmer-breeder mentions for *capability 7: psychological well-being*, that continued learning makes them proud and happy, even if it is exhausting at times (MAS FB5/FB6). Finally, one breeder sees their learning connected to the plants themselves (*capability 9; KS FB1*), as they build knowledge from observing plants over years, and hence views them as teachers.

#### **Capability 4: excellence at one's job**

For this capability, excellence is understood as experiencing autonomy and self-expression. Farmers are free to choose practices and projects which are in line with their perception of being a good farmer. In relation to seeds, practices of saving seeds, breeding, and preserving cultural heritage come to mind. By successfully engaging in them, farmers might experience an increased sense of identity in their work as well. Findings are listed in the categories of excellence, as well as sense, as these two aspects were most obvious in the interviews.

#### *MASIPAG*

**Excellence** means farming organically for MASIPAG's farmers (MAS FB3/FB4; MAS FB7/FB8; MAS FB5/FB6) and is emphasised as promoting a source of pride (MAS FB3/FB4). Farmers themselves are less likely to call it autonomy, but rather self-sufficiency. Organic agriculture requires more skill and no external inputs, compared to the conventional farming most of them practiced before, so farmers feel that they are better farmers (MAS FB5/FB6). The connection is reciprocal: organic farming leads to pride in being a good farmer, but also "we become better farmers if we are proud of what we do" (MAS FB3/FB4: 277).

Autonomy is also mentioned regarding knowledge development (see *capability 3*), as having farming knowledge and the skills to modify it makes farmers autonomous (MAS FB7/FB8). Farmers become innovators and are more independent (MAS ST1). The network's (former) coordinators think further and also put the sharing of breeding knowledge in this category (MAS CP2; MAS ST1). It improves the skills of farmer-breeder's and makes small-scale farmers

as a whole, independent of seed companies. Farmers are active participants in the improvement of farming knowledge again, instead of passive recipients (MAS CM2). They self-express by developing own practices within the network (MAS CP2; MAS FB5/FB6). It is mentioned for instance that some farmers plant a greater diversity of varieties than would be necessary on their farms, because they personally deem it important.

Experiencing a **sense of identity** in their work through seed commons practices is also described by the network's members. Receiving recognition for their work from others, both in breeding and organic farming, increases their sense of excellence and identity as a (MASIPAG) farmer (MAS CP2; MAS FB7/FB8; MAS ST2; MAS FB5/FB6; MAS FB3/FB4). The fact that questions of sense are addressed in these answers is a **furthering of the capability**. Sense is originally subsumed under psychological well-being (*capability 7*). Here it also mixes with getting respect for one's work, which is part of *capability 8*.

**No critical remarks** are made for this capability, save for the modesty of one farmer-breeder: "I cannot say if I am a better farmer. I let the other farmers be the judge." (MAS FB5/FB6: 415).

#### *Kultursaat e. V.*

Kultursaat's farmer-breeders **find excellence** in their work with seed commons. They learn new things every year and improve continuously (KS FB5; KS FB1; KS FB6; KS FB7). So, excellence is understood as continuous learning and that is facilitated by the network (KS FB5; KS FB7): "You are constantly requested to change ideas you have formerly created" (KS FB1: 30).

Interviewees give different explanations as to why they believe they become better farmer-breeders through the association. One aspect is that breeding allows farmers to get to know the entire plant life cycle (KS FB2), hence getting a more comprehensive insight into one's work. Another aspect is that seed multiplication and breeding are the most complicated types of farming (KS FB4), placing high demands on the farmers. If one masters this craft, one will likely also be a better commercial vegetable farmer. And lastly, besides breeding, the network's farmer-breeders have commercial farms of their own. They hold high standards to realise farming which is socio-ecologically desirable (KS FB8; KS FB9), a goal which is rarely rewarded financially in agriculture. Hence, one knows one is a good farmer, if one can make a living although one adheres to strict morals of sustainable agriculture.

**Sense** is also included in the answers of Kultursaat's members. Examples for the sense interviewees find, vary from personal to altruistic motives. Personally, one farmer cherishes the insights and connection with plants this work grants as adding sense to their life (KS FB8). Another personal motive is the possibility to ponder the question of where humanity should go (KS FB5). Other farmers emphasise their contribution to humanity's survival by stewarding seeds, as cultural goods for future food security (KS FB7) and taking on the task of creating and maintaining quality varieties for organic agriculture (KS FB9), filling a void left by contemporary European farming politics.

A **critical remark** is that not all farmer-breeders can relate to this capability. While one farmer-breeder reports that it is personally important to them to become better in their work (KS FB5), another asks what it should mean to become 'better' (KS FB8), apparently not regarding personal improvement to be relevant to the topic of seed commons. Another critical remark points out goal conflicts. Excellence is, in this case, understood as farming sustainably, which is seen to be at odds with current agricultural financial remuneration. The question is then how to practice sustainable agriculture in a holistic sense and still run a profitable farm (KS FB9).

The **capability is furthered** through a general redefinition of 'becoming better' in altruistic and personal senses. Regarding altruism, one farmer-breeder understands the capability rather as achieving better variety creations than becoming better as a breeder (KS FB3). This changes the view from personal to societal achievement. On a personal level, improvement is repeatedly viewed as achieving a more desirable working environment, rather than producing more or faster outcomes. This includes being able to experience everything the job has to offer by gaining intimate knowledge of the entire plant life cycle (KS FB2) and having more intense experiences each year (KS FB6), but also being more content with one's work (KS FB8) and realising individual quality of life (KS FB6). Excellence is hence redefined in a more wholistic sense of contentment with one's experiences and societal work impact.

### *Findings for both organisations*

Regarding **capability links**, this capability is one of the least distinct. While *capability 3*, which is described above, links to most other capabilities, this capability anticipates various others, as mentioned above when reporting MASIPAG's findings. Becoming excellent in one's job seems to frequently be understood as experiencing sense and fulfilment in one's work (KS FB5; KS FB4; KS FB6) and having a job that is psychologically beneficial (KS FB4). This is what *capability 7: psychological well-being* is meant to describe. It is

also understood as being good enough to be respected in one's profession (MAS CP2; MAS FB7/FB8; MAS ST2) and become a better person who concerns themselves with society's well-being (KS FB5), which is what *capability 8: giving and receiving support and respect*, is meant to cover.

Less debatable connections are drawn to several other capabilities. Most prominent is *capability 3: sharing of (seed) knowledge* (MAS CP2; MAS CM2; MAS FB3/FB4; MAS FB7/FB8; MAS ST2; MAS ST1; KS FB5; KS FB3; KS FB1; KS FB7). Farmer-breeders view the knowledge exchange in their organisations and their continued observations, as driving forces for their own (work-related) development. A Kultursaat breeder sums up that breeding is creative (*capability 5*) and creativity needs exchange (KS FB3). Specific for the German context are two further capability connections: First, *capability 1: control over one's economic future* (KS FB8; KS FB9), as agricultural excellence is a prerequisite to running a profitable farm and having the leverage to do so in a socio-ecologically sustainable way, as this means additional costs which are not fully remunerated through sales. Second, farmer-breeders feel that their close examination of plants is a key to becoming better, an aspect of *capability 9* (KS FB8; KS FB2).

### **Capability 5: creativity and critical thinking**

Applying one's mental resources to emerging problems is a fundamental need of humans. In conventional seed markets, there is little space for creativity or critical reflection for farmers beyond the choice of seeds, as the market is highly regulated. This capability hence enquires into farmer-breeders' use of imagination and reasoning.<sup>174</sup>

#### *MASIPAG*

**Creativity** becomes most apparent in farmers experimenting with technology, for example by trying variations in ingredients, as described above (MAS CP2; MAS CM2; MAS FB1/FB2; MAS FB5/FB6). Both staff and farmers describe their creative adaptations:

“in MASIPAG [...] farmers [go] from passive recipients to active participants in technology generation and that's where the creativity comes in” (MAS CM2: 68)

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174 The ability to express oneself creatively and think critically about one's work is part of the former capability *excellence in work and play* (see chapter 3.2 *The Capability Approach for Seed Commons*). It has been split in the interviews, however, as both abilities are especially relevant for seed work.



“MASIPAG encourages us to create, modify, adapt. It teaches us not to contain ourselves on this system. If you can improve it, improve it.”  
(MAS FB3/FB4: 281)

In an expression of creativity, farmer-trainers develop their own methodology and style for teaching (MAS ST2) and farmer-breeders' choice of parent materials is likewise creative (MAS FB5/FB6).

Teaching farmers to **think critically** is an explicit (formal) development goal in MASIPAG (MAS CM2). It is conveyed through training (MAS ST2) and then backed by continued individual learning and research (MAS FB7/FB8). One farmer goes so far as to describe it as personality development (MAS FB1/FB2).

One expression of farmer's critical thinking is the structured, semi-scientific observation they apply to their farming (farmer-scientist approach; MAS CM2; MAS FB3/FB4), as well as their comparisons of these observations with others (MAS FB5/FB6).<sup>175</sup> In this way, farmers build their own hypothesis in order to modify technology for themselves. A board of scientists checks these farmer-inventions for scientific accuracy in discussion with the farmers (MAS ST2). Another example of thinking critically is that farmers anticipate events such as typhoons (MAS FB3/FB4) and react accordingly by preparing their farms (MAS FB7/FB8) and collaborating with other farmers in the community.

Finally, farmers report they have become more critical towards conventional farming systems (MAS FB3/FB4).

Neither **critical remarks** nor **furthering** of the capability are reported.

### *Kultursaat e. V.*

Kultursaat breeders wholeheartedly agree to **expressing creativity** in their work. They explain that practicing farming and breeding needs creative solutions all the time, as new challenges come up constantly (KS FB2; KS FB3; KS FB4; KS FB1). This starts with the question of how to best pollinate a certain crop (KS FB2) and ends with matching the needs of all people involved on a farm (in this case a farm which employs people with disabilities) with the needs of plants (KS FB4). Breeding itself is creative and the possibility to express artistic freedom and one's personal abilities, are core components of

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175 This practice is further encouraged by MASIPAG's structure, as not all agronomic characteristics are included when seeds are given from the BUF to farmers so that they might observe for themselves (MAS ST2).

the association (KS FB10). This includes freedom in breeding conduct, so every breeder can use breeding methods which suit them personally (in accordance with Kultursaats principles and quality standards; KS FB5; KS FB10).

Not all breeders see themselves as the main actors, though. For some, creativity is involvement with the plant (KS FB6; KS FB10): The plant is the creative one, the breeder observes closely and helps new traits to come forth, which the plant is willing to show (KS FB6).

Several farmer-breeders mention knowledge exchange as fostering creativity (KS FB3; KS FB9; KS FB7). In this way, they feel that being involved with the association and its regular meetings and breeding groups enhances their breeding creativity.

**Critical thinking** is connected to Kultursaats seed commons in various forms. First, it is required and fostered through farming (KS FB4) and breeding (KS FB6) itself, as one has to constantly gather information, evaluate it and make decisions. This includes determining breeding goals with several factors and criteria in mind (KS FB3; KS FB6). Second, the exchange within Kultursaats repeatedly challenges one's views by having to interact with people who hold different opinions and find common ground with them, to remain united as an association (KS FB1; KS FB7). Also, critical questions from colleagues and employers about one's work (KS FB1; KS FB10; KS FB7) trains breeders in critical reflection of their breeding proceedings.

Apart from breeding, the network fosters critical thinking for general moral formation. The (globalised) agricultural system gets scrutinised (KS FB5; KS FB2; KS FB10; KS FB8). This entails questions of privatisation (KS FB2), makes members view the world with its political and economic connections differently (KS FB8), and encourages thinking one's own part in that system through to the end (KS FB2; KS FB4). The association is a knowledge hub in that regard and "the more insights one gains, the more discerning one can be" (KS FB9: 54).

Finally, the association itself requires critical thinking to answer upcoming structural-organisational questions (KS FB5; KS FB1). For example, recently conventional retailers expressed an interest in marketing the association's seeds and members needed to decide which capitalistic actors they could imagine affiliating with, and how (KS FB5).

Several **critical remarks** are made for this capability. One breeder feels that seed commons have no impact on their creativity (KS FB8). Others feel that creativity is somewhat restricted by customer demand, as breeding projects

depend on what the adjoined seed company suggests (KS FB5). Some bred varieties are thus rejected by Kultursaat's sales company, which frustrates breeders as they wish to see their varieties in use (KS FB3). Nevertheless, a breeder who formerly worked in private sector breeding reports that they had considerably less freedom of choice in breeding before, and their creativity was impeded by that, as profit was the main goal (KS FB3). Half-jokingly, one member notes that manifesting one's values in organisational structures within the legal (grey) zone is also a creative challenge (KS FB2).

A critical thinking restriction not through, but for seed commons, is described in the narratives of conventional breeding. Dogmas such as 'we need modern breeding techniques to feed the world', are naïve, as they disregard the global distribution problem and ignore the value of seed sovereignty (KS FB2). As these narratives have been historically promoted, they are common sense to a large part of society. Not critically reflecting on them, hampers the dispersion of seed commons.

**No furthering** of the capability is mentioned.

#### *Findings for both organisations*

Several **capabilities linking to creativity and critical thinking** are indicated. Critical thinking connects to *capability 1: control over one's economic future* for MASIPAG's farmer-breeders (MAS CP2; MAS FB3/FB4). They refer to anticipation and planning for calamities, which they are taught to do in the network's training. Knowledge sharing (*capability 3*) is centrally connected to this capability (MAS ST1; MAS FB3/FB4; KS FB3; KS FB8; KS FB9; KS FB10; KS FB1; KS FB7). For MASIPAG, critical thinking is central to their basic farmer training. Exchange with peers for Kultursaat helps to keep and refine a critical stance, as well as develop one's critical assessment in breeding. This same mechanism is furthermore connected to *capability 8: giving and receiving support and respect* (KS FB3; MAS ST2) for both organisations, as this exchange is recognised as support from others to improve one's knowledge. A critical remark in this regard is that striving for customers' support and respect means to adhere to their wishes, which hampers one's own creativity. Lastly, connections to *capability 9: connection with plants*, are drawn (KS FB6; KS FB7), as Kultursaat's breeders feel that their creativity is fostered by their observation and living with their plants, just as it is fostered by their exchange with their human colleagues.

## Capability 6: bodily health

‘How does farming with seed commons affect your physical well-being?’ That is the question interviewees are asked. Included in the description of this capability are bodily integrity and safety, a safe and pleasant environment, and food sufficient in quantity and quality. Findings are presented in these three categories.

### *MASIPAG*

Farmers report two things with account to **bodily integrity and safety**. First, they get sick less often than before their conversion to organic farming (MAS CP2; MAS CM2; MAS ST2; MAS FB7/FB8; MAS FB5/FB6). They connect this mainly to the ceding of pesticide use, but also healthier food due to their organic and diverse subsistence farming.

Second, MASIPAG promotes a healthy lifestyle (MAS FB1/FB2; MAS FB3/FB4) in general, including the factors mentioned above, but not limited to them. One credo is that ‘health is wealth’, indicating that better health leads to less expense for medical treatments (MAS FB1/FB2). While it is formulated as an individual capability, one farmer stresses that health is not only thought of for oneself or for one’s family:

“So, you don’t just concern yourself, but concern yourself to the community. [...] Don’t be concerned only with yourself, but with the planet and the people as well.” (MAS FB3/FB4: 289)

The network’s seed commons also contribute to a **safe and pleasant environment**. As said, refraining from use of chemical pesticides in organic farming leads to a healthier farming environment (MAS CP2; MAS CM2; MAS ST1; MAS FB3/FB4; MAS FB7/FB8; MAS FB5/FB6).<sup>176</sup>

One farmer also describes how they use herbal remedies which grow on their farm to keep themselves and their family in good health (MAS FB5/FB6). As conventional farms tend to have less plant diversity beyond the cash crops they grow, this can also be attributed to MASIPAG’s promotion of diversified and integrated organic farming.

Lastly, **food sufficient in quantity and quality** is a factor of bodily health farmers emphasise. Organic food is healthier than conventionally grown staples (MAS CP2; MAS FB3/FB4; MAS FB7/FB8; MAS FB5/FB6) and safer

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176 More aspects of aesthetic environmental pleasantness are detailed in *capability 11: beauty in life*.

(MAS FB1/FB2; MAS ST1), as it is not contaminated with chemicals (MAS ST1). It is not only the absence of harmful substances, however, that makes farmers' food healthier. Farmers eat the diverse foods they grow on their farms and MASIPAG promotes unpolished rice which has more nutrients (MAS CM2). Again, it is stressed that this healthy food is not only for personal consumption, but also sale, as MASIPAG's farmers – in contrast to other farmers in the community – apply the same care and standards to the crops they produce for sale (MAS FB3/FB4).

Neither **critical remarks** nor **furthering** of the capability are reported.

#### *Kultursaaf e. V.*

Regarding **bodily integrity and safety**, Kultursaaf's farmer-breeders agree that vegetable farming and breeding is a physically demanding job (KS FB2; KS FB10; KS FB4; KS FB1; KS FB6). While some suffer back pain from it (KS FB2; KS FB10; KS FB6), others feel their bodies strengthen with the ongoing physical demand (KS FB10; KS FB1).

Members feel they work in **safe and pleasant environments**, having outside jobs with lots of fresh air (KS FB5; KS FB10) on beautiful farms (KS FB7; KS FB1).

Lastly, **food sufficient in quantity and quality** is only mentioned once (as it is probably not a central concern for the middle European farmers). The association's varieties have a special food quality palpable when eating them (KS FB9).

One **critical remark** is made in that organic farming in general has these effects, regardless of whether seeds are held as commons or private property (KS FB3; KS FB4).

No **furthering** of the capability is mentioned.

#### *Findings for both organisations*

Three **linking capabilities** are mentioned. MASIPAG connects physical health to *capability 1: control over one's economic future* (MAS FB1/FB2; MAS CM2). Better health through organically produced subsistence food cuts expenses on medical bills, and the unpolished rice promoted by the network has both higher profit margins and holds essential nutrients which go missing when the rice bran is polished away. Kultursaaf makes little distinction between this capability and *capability 7: mental health* (KS FB8; KS FB9; KS FB7). Breeders report that their (physical) work outside in the fields makes

them content and happy and the quality food they produce and consume makes them feel great. Lastly, *capability 8: giving and receiving support and respect* is also connected (MAS FB3/FB4), as healthy food is not only thought of for oneself, but also one's community.

### **Capability 7: psychological well-being**

This capability includes negative and positive associations of psychological well-being. Conflicting feelings, economic and ecological anxieties surrounding seeds are examples of the negative end of the scale. Inner peace (Robeyns, 2003), identity (Grisez et al., 1987), pride for their work and self-worth are positive ones. Findings are presented according to the two broad categories of positive and negative psychological impacts.

#### *MASIPAG*

**Negative impacts** on psychological well-being are presented first. A large part of it is the range of worries usual in (conventional) farming, which cease to exist with MASIPAG, hence becoming a positive influence. These will be addressed first. Another part speaks of the opposite: worries farmer-breeders have because of engaging in MASIPAG's organic seed commons, which are presented next.

Agricultural production on the Philippines is faced with a lot of uncertainties (weather, price at harvest and so on) which leads farmers to worry about their future (MAS ST2), especially in conventional farming. Farmers take up agricultural loans to buy seeds, pesticides, and fertilizers (as described in *Case Studies*: The German Breeder Association Kultursaat e. V. and the Philippine Farmer-Breeder Network MASIPAG above). They depend on companies and money lenders (MAS FB3/FB4). Coordinators report that the worry of not being able to pay the loans back, causes stress (MAS CP2; MAS CM2). The high pressure drives farmers not to take any free time in fear of making a crucial mistake and becoming further in debt (MAS CP2). All of this causes stress related diseases (MAS CP2).

While still being a conventional farmer, a MASIPAG member reports experiencing limited opportunity for creativity and improvement (MAS FB3/FB4). They report that seed and farming knowledge are drained from farmers, which causes dependency and leads to stress:

“MASIPAG teaches us to give seeds, maintain genetic resources. In the conventional system: No, you have to buy seeds. But now, you don't need to buy seeds, you buy seedlings. So, they drain your knowledge of

seed gathering, seed saving. Now they are draining farmers' knowledge particularly on growing seedlings. It is dependency.” (MAS FB3/FB4: 269)

MASIPAG members feel that the stresses of conventional farming recede when adopting organic farming practices. Farmers do not need to take on loans when producing organically (MAS CP2; MAS ST2), as they produce all farming inputs on farm. Some of them are free of debt (MAS FB5/FB6). Also, a well-balanced, diversified farm needs less monitoring (MAS CP2), so farmers have some spare time to relax.

Organic farming has its own challenges, however, and has certain negative psychological well-being effects for farmers. As organic farms build on a complex ecological interplay, farming can be harder to monitor on a diversified farm (MAS CP2).

MASIPAG's seed commons build on continued learning, farmer-leadership, and community exchange. These practices are time intensive for farmers. They report that the amount of time spent in meetings and travel cause them stress, as that is time they cannot spend on farm work, and they do not know if everything is going well on their farms (MAS FB1/FB2; MAS FB5/FB6) – farmers mention that they need understanding and supportive families.

While entering into a likeminded community within MASIPAG, farmers experience tensions with their original farming communities when affiliating with the network and converting to organic farming. Neighbours are ignorant of organic practices and perceive farmers who change, as outsiders or weirdos (MAS FB1/FB2; MAS FB3/FB4):

“We are laughing stock. They laugh at us when they see that we plant small portions of ten different varieties of rice. It's unusual. They laugh at you. They say ‘Ah, something is wrong with you.’ Then you pick animal poo – ‘Ah, something is wrong with you.’ Because what's normal to them is the conventional.” (MAS FB3/FB4: 269)

Likewise, conventional farmers become jealous if an organic farm runs well, either in an interested or a threatening way (MAS FB3/FB4).

MASIPAG encourages farmers to political actions, as described in *Capability 2: participation in political decisions*. With a rigid political environment on the Philippines, political involvement is potentially risky. One farmer describes worries related to political actions in the beginning, often asking himself “what if...?” (MAS FB3/FB4: 297). Involvement is becoming more threatening with

increasing militarisation in the Philippines and frequent classification of farming organisations as counter-governmental by the executive (MAS FB3/FB4; MAS FB7/FB8).

There are also **positive impacts** on psychological well-being through MASIPAG. First, as mentioned above, farmers in general experience fewer financial worries than they would in the conventional system (MAS ST1). Beyond that, farmers hold positive perceptions of the future and their immediate environment. They recognise their infinite, self-sufficient supply of all farming inputs, farming knowledge, and community support (MAS CM2; MAS CM2; MAS FB3/FB4; MAS ST2; MAS ST1).

“MASIPAG farmers have their own seed, they produce their own fertilizers, they produce their own botanical sprays.” (MAS ST2: 295)

Diversification serves as biological insurance (MAS ST1; MAS CP2) and lessens the risk of major yield loss. In the years after converting to organic farming, farmers experience increasing farm yield, which makes them hopeful (MAS CP2).

“They become more confident that the seed is just within their backyard, within their house. The technological knowledge is already within their hand, or they have their neighbours can help them or the other members of the organisation for mutual support, social insurance. [...] Helping one another and belongingness and that’s important.” (MAS CM2: 74)

That they can continually learn and become better at farming adds confidence (MAS FB5/FB6) and connects to farmers feeling empowered through MASIPAG (MAS FB3/FB4; MAS CM2). Being part of the network “gives us a sense of pride, a sense of belongingness, a sense of ownership, personality” (MAS FB3/FB4: 269). Feeling one belongs is valuable for organic farmers in the Philippines (MAS CP2; MAS FB3/FB4), as organic agriculture is still an unusual practice, as described above. Belonging to a group of likeminded peers provides reassurance that organic practices are good (MAS FB3/FB4).

**Critical remarks** for this capability are included in the description above.

Including a sense of belongingness (to a community, network, etc.) **further the capability**. It connects to identifying as a farmer, but emphasises the social aspect of it, which has been overlooked when conceptualising the capability.



*Kultursaat e. V.*

Kultursaat's farmer-breeders share the **negative** impacts their work with seed commons has on their mental health. Much of it is connected to (organic) farming and running a farming business per se and not specifically breeding or seed commons.

Farming means a lot of work, which is a strain (KS FB2; KS FB5). There is the double responsibility of profitable farming and family life (KS FB5), as well as a constant worry about one's plants, one's farm and the work one should be doing on the farm whenever away (KS FB6). The latter is reported for the association's meetings, where farmer-breeders travel for a few days. In addition to long working hours, most organic farm-work is tedious and unilateral (KS FB10), like chopping up weeds. At other times, constant peak concentration is required, for example when selecting from several thousand cabbages (KS FB2), which is a strain in the other direction. Kultursaat's members also report a danger of self-exploitation due to their ardency for the cause (KS FB3; KS FB6).

“The breeding work we perform... because we know it's based on donations, we never write down all hours and costs we have.” (KS FB6: 9)

Finally, setbacks and critique are inherent in breeding (KS FB8; KS FB1), for example if a line bred for several years fails.

Kultursaat's farmer-breeders express general **positive psychological impacts** of their work by variously saying that they believe they have a beautiful job which makes them happy and content and is exactly what they want to do (KS FB8; KS FB6; KS FB7).

Part of this is the general seed commons working environment. Kultursaat enables relatively stable financial support through breeding-contracts (KS FB5) and undertakes administrative work for farmer-breeders (KS FB5). Members enjoy working in teams (KS FB10) and being connected to a community of peers (KS FB7). Breeding in general is perceived as a seasonally interesting and exciting profession, for example when selecting plants in autumn (KS FB10). Open-pollinating varieties in particular set a worthwhile mood and atmosphere for the members (KS FB9).

More than the formal working environment, members report relishing the different working approaches they can take within the association. The freedom breeders have in their work makes them happy and is conducive to the development of free thinking (KS FB5; KS FB7). Breeding in itself is described as being immersed in all senses at once (KS FB4) and as providing moments of

standing still and concentration (KS FB6). Their work is stabilising (KS FB1), grounding and slowing in the face of an otherwise ever-accelerating life (KS FB4). It also aids in staying alert and present (KS FB6). This is amplified by Kultursaat's bio-dynamic approach which can include meditative and consciousness practices. These contribute to psychological health (KS FB9) by adding layers of mindfulness to farming.

“I am not sure if this is connected to seed commons. The differences between hybrids – the normal you get when you buy now – and open pollinating varieties are immense regarding quality. [...] Inner [bio-dynamic] qualities. [...] And if one says now: ‘Ok, the open pollinating varieties only emerge because of commons-oriented breeding’, then that has a big influence, of course” (KS FB9: 12).

Also, Kultursaat's varieties make it possible for breeders to have a different connection to plants through working with them (KS FB8).

Most of all, the farmer-breeders rejoice in being able to follow their values in their work, working for a cause and feeling connected to what they do (KS FB10; KS FB8; KS FB7; KS FB2). Kultursaat's farmer-breeders experience freedom to work in alignment with their values and ideals (KS FB6; KS FB7; KS FB8; KS FB9; KS FB10). This is true for farming, breeding, and work in general, as these quotes illustrate:

“We want to work biodynamically [...] and we agreed to use open pollinating varieties as much as possible. [...] We accept a certain degree of less yield by using open pollinating varieties. [...] Because we do not only act upon economic profitability, [...] we are ready to use open pollinating varieties [...] because we are completely behind the idea” (KS FB8: 22).

“You don't earn well. [...] But... control [over my economic future] is insofar completely present, that I do what I want to do” (KS FB10: 28).

Maintaining and providing organic seeds for society (KS FB7) gives an invigorating sense of purpose (KS FB2), while breeders can take responsibility (KS FB8) and feel efficacy (KS FB1). “If I do things which have purpose, even though they are exhausting, they always sustain me in the end.” (KS FB2: 31).

A **critical remark** is made towards acceleration in conventional farming and life in general (KS FB4). The interviewee feels that they need to actively carve out serene space for themselves to avoid being dragged into a fast-paced life.

**No furthering** of the capability is mentioned.

### *Findings for both organisations*

Several **linking capabilities** are mentioned. MASIPAG's coordinator connects psychological well-being to *capability 1: control over one's economic future* (MAS CP2), as farmers become more positive about their future when seeing their farm prospering year after year after they convert to diversified organic farming. MASIPAG's farmers refer to *capability 3: sharing of (seed) knowledge* (MAS FB3/FB4; MAS FB5/FB6), as regaining seed knowledge feels empowering and although the added work and meetings are tiring, they say that it is worth it. A Kultursaat breeder says that being a great (meaning value adhering) farmer and breeder is satisfying, hence connecting their well-being to *capability 4: excellence at one's job* (KS FB8). That breeder and some peers also intertwine mental and physical well-being, as described above in the findings for *capability 6: bodily health* (KS FB7; KS FB8; KS FB9). For a MASIPAG farmer, mental health has a community component, as they feel empowerment and belonging through connection to a likeminded group (*capability 8: giving and receiving support and respect*; MAS FB3/FB4). Another says that less economic stress equals beauty for them, which is part of *capability 11: beauty in life* (MAS FB5/FB6). Lastly, *capability 9: personal connection to plants* is part of mental well-being for a Kultursaat breeder, as that is a deep personal wish (KS FB8).

### **Capability 8: giving and receiving support and respect**

Having connection with others is a core human need. As work is a large part of adult life, receiving and giving support and respect in one's professional environment matters. This capability has two main aspects: giving and receiving social support and (Robeyns, 2003) feeling respected and treated with dignity.

#### *MASIPAG*

**Social support** has various facets for members of MASIPAG. Farmers express a feeling of duty to *give* social support to other individual farmers. This holds for sharing seeds (MAS ST2; MAS ST1; MAS FB5/FB6), as well as knowledge (MAS CP2; MAS FB3/FB4; MAS FB7/FB8) and helping each other out beyond that (MAS CP2; MAS FB3/FB4; MAS FB7/FB8). One farmer says: "I came to believe that my fellow farmer is my responsibility" (MAS FB7/ FB8).

Support is also given on a communal or institutional level. Farmers share ecological information and raise awareness for problematic current agricultural production in the Philippines (MAS ST2). For example, farmers who discover

new pests share their knowledge with the local Department of Agriculture, so the institution can warn farmers in the region (MAS FB3/FB4).

MASIPAG farmers also *receive* support. For once, the (practical) support they are willing to give, is also reciprocated. Non-material support is described in *Capability 7: psychological well-being*, in that being backed by a community or friends when converting to organic agriculture is seen as valuable moral support (MAS FB3/FB4). The network's institutions offer more specific support. First it is mentioned that the scientist board helps farmers to improve their invented technology (MAS CM2; MAS FB3/FB4; MAS ST2), supporting farmers to become ever better farmer-scientists. And second, MASIPAG offers help when POs experience internal problems (MAS ST2).

For **respect and pride**, MASIPAG's members concentrate their answers on receiving, not giving. Farmers are proud of holding seeds and knowledge, as that translates to them being in control of their farming (MAS FB3/FB4; MAS ST2). More detailed accounts of pride in farming are showcased in *Capability 7: psychological well-being*.

Being chosen as a representative to the local PCB, or any other official representative body is experienced as being respected amongst one's group (MAS CP2; MAS CM2; MAS FB1/FB2). Farmers feel societal respect when they speak at official political, academic, or social events (MAS CM2), which MASIPAG encourages. Respect is not only paid to farmers for being equal members of the network, but also for being unique in their choices and backgrounds, as different cultures are respected amongst POs (MAS ST2).

From the opportunities to receive respect, it is shown who farmers get respect from. For once, the culture amongst MASIPAG's members is explicitly respectful, so farmers experience respect from their fellow farmers at MASIPAG (MAS FB3/FB4; MAS FB7/FB8; MAS ST2). Beyond that, conventional farmers tend to pay them respect for farming organically, which is considered more complicated than chemical-based farming (MAS CM2; MAS ST2; MAS FB5/FB6). An anecdote from the interview says that the term MASIPAG-farmer has become as much a label for responsible and sustainable organic agriculture practices in parts of the Philippines, that it is enough to say one is a MASIPAG farmer to be credited with having great organic produce (MAS ST2; MAS CM2). The network's farmers also support non-MASIPAG members by sharing their seeds and knowledge, which also grants them respect (MAS FB5/FB6). The above points express respect between peers for being good at one's job. MASIPAG however encourages farmers to seek professional exchange with academic and political experts as well, which enables them to experience

a wider range of social respect. Being taken seriously in discussions with scientists and academics (MAS CM2; MAS CP2; MAS FB5/FB6) reinforces feelings of excellence and sense of pride in farmer-breeders' work (MAS CP2). It adds to farmer-breeders' confidence in themselves (MAS CM2). Other institutions mentioned as respectful during interviews are local Departments of Agriculture (MAS CP2; MAS FB3/FB4) and associated NGOs (MAS CM2). One farmer sums up: "Having that kind of empowerment [that MASIPAG's farmers have], other people will automatically give you some respect" (MAS FB3/FB4: 306).

What is true for farmers is further exacerbated for farmer-breeders. Farmer-breeders are taken seriously in their breeding and are recognised as breeders in MASIPAG and their communities (MAS CP2; MAS CM2; MAS FB1/FB2; MAS ST2; MAS FB5/FB6). The use of farmer-bred lines is documented all over the Philippines (MAS CP2), and farmers are recognised, even after passing away, in the network through the lines which carry their acronym (MAS CP2; MAS ST2). MASIPAG's farmer-breeders receive societal recognition as custodians of biodiversity and strongholds against corporate commodification (MAS FB1/FB2).

A **critical remark** on the behalf of respect is one already described in the previous capability: when converting to organic farming, farmers are likely to be laughed at by their communities, hence somewhat disrespected (MAS FB3/FB4; MAS FB5/FB6). This seems to be a transitory state, however, until the other farmers realise the profitability of MASIPAG farmers' farms.

No **furthering of the capability** is mentioned.

#### *Kultursaat e. V.*

Kultursaat's breeders *experience social support* from their colleagues (KS FB5; KS FB3; KS FB10; KS FB8; KS FB9; KS FB6; KS FB7). They value the exchange (KS FB5; KS FB3) and transparency (KS FB3) within the association. However, their fellow breeders are not the only source of support. Also mentioned are farmers on the same farm (KS FB4), neighbours (KS FB1), customers, for example in the farm-store (KS FB2; KS FB10), likeminded locals (KS FB9) and the (anonymous) private and corporate donors who finance the breeding through a fund (KS FB1). No references are made as to where they *give support*, though it is repeatedly mentioned in *Capability 3: sharing of (seed) knowledge* that sharing what one knows to help others or train junior breeders is an elemental and cherished practice in the association.

Similarly, when asking about **respect and pride**, Kultursaat breeders list similar groups of people. Besides respect from and for colleagues (KS FB5; KS FB3; KS FB8; KS FB7), external persons with and without farming background express their respect (and interest) for this work (KS FB5; KS FB2; KS FB10; KS FB8; KS FB1; KS FB6). A young breeder finds that “green jobs are better regarded in society than they are paid” (KS FB10: 92). Outsiders assume that one is competent at one’s job (KS FB8). Also mentioned in terms of paying respect, are companies who contract farmers for seed multiplication (KS FB4) and donors, who show great interest in the work overall (KS FB3). One breeder with experience in conventional breeding feels that the breeding environment within the association, and in organic breeding provides much more respect and support than they have formerly known (KS FB3).

One interviewee expresses pride at conveying sustainability values to others and thereby influencing their surroundings (KS FB2). Another says that it is important for breeders to know that their varieties find recognition amongst farmers (KS FB3; KS FB1; KS FB6). Both, in a way, refer to enriching society with one’s job-related outcomes and learnings.

**Critical remarks** are made. First, the value chain from breeding to vegetable consumption is long and feedback from end consumers does not reach the association, which leaves a void in knowing how the people one intentionally produces for like one’s work (KS FB4). Second, while many are interested, people generally understand little about breeding (KS FB6), leaving a knowledge gap where there is still leverage for more external (financial) support. And third, while receiving support on a multi-family farm, breeding is not as free as on independent farms, but considered for its profitability by farming colleagues (KS FB2). Being part of communal support structures is therefore both liberating and limiting.

The capability is **furthered** by adding an element that seems important to Kultursaat’s farmer-breeders: **belonging**. While this aspect is meant to be a part of *Capability 7: psychological well-being*, it is repeatedly mentioned in interviews at this point. Breeders hold the belief that what you do should benefit someone (KS FB3) and extend their concerns from the association’s community to humankind (KS FB5). Their sense of belonging to the organic breeders’ group is further enhanced by the trust external others have in them to do their job well (KS FB8). They also feel a sense of belonging with non-breeders who share their ideals and worldview (KS FB9).

### *Findings for both organisations*

This capability **links to a few capabilities**. It helps MASIPAG farmers to take control over their economic future (*capability 1*) as farmer-bred varieties are “considered owned by the farmers throughout the Philippines” and can be freely used by all (MAS ST2: 264). Through MASIPAG’s support system, farmers feel confident to engage with (local) politics (*capability 2: participation in political decisions*; MAS ST2; MAS FB3/FB4). The strongest connection throughout the code matrix is that between support and respect and *capability 3: sharing of (seed) knowledge* (MAS CP2; MAS ST2; MAS FB3/FB4; MAS FB5/FB6). Support and knowledge sharing are often used interchangeably by MASIPAG members, while Kultursaat members make a clearer distinction. Similarly, the connection to *capability 4: excellence in one’s job* (MAS CP2; KS FB5) also points towards becoming better through support from others, especially through knowledge sharing. Creativity and critical thinking (*capability 5*) is mentioned by MASIPAG, as the organisation is structured to enhance critical thinking in various forms, supporting farmers as they strive for food sovereignty (MAS ST2). One of Kultursaat’s farmer-breeders on the other hand, ponders how creativity as artistic freedom balances with the wish for respect from farmers who use the varieties in the end (KS FB3). Lastly, MASIPAG also connects *capability 7: psychological well-being* to respect, as receiving respect from others for being an organic farmer gives farmers pride, which is conducive to mental well-being (MAS CM2; MAS FB1/FB2; MAS FB3/FB4).

### **Capability 9: personal connection to plants**

Farmer-breeders might have a vital connection with plants and nature in general. Findings are presented through reports of personal connection with plants or nature and an understanding of nature as interrelated with humans or mutually co-dependent.

#### *MASIPAG*

Farmer-breeders experience **personal connections to plants and nature**, although this capability is not answered as enthusiastically as others. The staff mention that breeders tend to have and plant larger collections of rice varieties than would be necessary for their farming or breeding (MAS CP2; MAS ST2), suspecting a personal interest or satisfaction in doing so. In general, MASIPAG’s farmers interact with their plants more and closer, through organic diversified farming, than they would in other styles of farming (MAS ST1). Through that they develop a feeling of responsibility for plants and seeds (MAS FB3/FB4;

MAS FB7/ FB8), some reporting to care for them as for family members (MAS FB5/FB6). This includes talking to their plants and the nature surrounding them (MAS ST1; MAS FB5/FB6).

About the **interrelation of plants and humans**, farmers say that seeds and biodiversity are necessary for the future of human food (MAS FB3/FB4; MAS FB7/FB8). By understanding that plants are providing for humans (MAS FB3/FB4), personal connection is reported to necessarily evolve (MAS CM2; MAS FB7/FB8):

“You know that you are dependent, that the plant is providing for you [...] The plant will convert the nutrient of the soil for your needs.”  
(MAS FB3/FB4: 321)

Neither **critical remarks** nor any **furthering** of the capability are reported.

#### *Kultursaat e. V.*

Kultursaat’s farmer-breeders wholeheartedly agree to having a **personal connection to plants and nature** (KS FB5; KS FB2; KS FB4; KS FB9). Some report always having had that connection (KS FB5), others say their connection grows stronger over the years when getting to know plants more closely and intimately (KS FB5; KS FB2; KS FB10; KS FB1; KS FB7). Some state that their plants feel like their siblings or children (KS FB2; KS FB5). The farmer-breeders give several reasons for the growing connection. Breeding means constant engagement with plants (KS FB10) and spending a lot of time living with the plants and their processes (KS FB1). Pragmatic breeding aspects mix with an emotional excitement for the plant’s growth and behaviour (KS FB2). It is also pointed out that engaging in the plant’s whole life cycle gives a different view (KS FB2; KS FB4):<sup>177</sup>

“To really experience plants, which you do not harvest in their youth, which are then gone, but rather which are allowed to mature, that are afterwards only... well where only the seed remains – that’s incredibly beautiful for me. Because it really is a life, a plant life ... up to the end” (KS FB4: 38)

“It is an enormous enrichment to observe the whole life cycle of a plant through seed multiplication and breeding” (KS FB2: 21).

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177 In vegetable farming, plants like carrots are harvested after a fraction of their life cycle, as they are sweeter and better suited for consumption when they are young. Most farmers never see them bloom, as they only flower in their second year.



Breeders express the urge for a different way of dealing with plants than practiced in conventional agriculture (KS FB8). They want to be true to the plant's essence and have room to experience the plant as a fellow living being through spiritual practices, like meditation (KS FB1; KS FB9). Breeders express the wish to have even more time for observation and contemplation of plants (KS FB1) and to engage with them more intensively and with more (intangible) knowledge (KS FB6; KS FB7).

One farmer asks questions about which responsibility one has for the plants one farms and how much one should push them in the breeding process (KS FB8). This breeder understands breeding (and the changes in plant traits that entails) as a proposal to plants (KS FB8), asking them: "Can you imagine that as well? Do you want to set out on that path with me?" (KS FB8: 64).

Breeding provides farmer-breeders with new insights into the **interrelation of plants and humans** (KS FB8; KS FB1), as well as plants and nature (KS FB1). Understanding how reliant humans and crop plants are on one another, gives a heightened sense of responsibility for plants, but also self-efficacy as breeders (KS FB8). Over time, breeders report to find ever more layers to this connection (KS FB7) and understand what humans can learn from plants (KS FB7) – such as adaptability and patience.

As a **critical remark**, one breeder cannot relate to this capability. They do not see a personal connection to plants, but rather ardency for their breeding projects (KS FB3).

There is **no furthering** of the capability.

### *Findings for both organisations*

Most **linking capabilities** for a connection with plants are only mentioned once. For the connection to *capability 1: control over one's economic future* (MAS CP2), for example, MASIPAG's coordinator observes that farmer-breeders (who enhance the economic future of Philippine farmers through the production of new varieties) tend to plant more different varieties on their farm than would be necessary for farming or breeding, hence pointing to a personal interest and connection to plants. Having a personal wish for a different connection to plants links one breeder's answer to *capability 7: psychological well-being* (KS FB8), and another breeder feels that close connection and observation of plants brings beauty to their life (*capability 11*; KS FB2). *Capability 3: sharing of (seed) knowledge* is referred to slightly more often (KS FB1; KS FB6). The connection of plants and humans is a field where breeders want more knowledge and to continue learning, although it is not strictly necessary

for breeding or farming success. Because it takes excellence in one's job (*capability 4*), to know and treat plants more wholly as living beings and still make a living from it, two breeders see a connection (KS FB2; KS FB8). Lastly, *capability 10: spirituality*, plays a role (MAS CM2; MS FB4; KS FB9) as engagement with plants is seen as a spiritual practice by some and others view a connection to plants as a consequence of certain spiritual mindsets.

### **Capability 10: spirituality and religion**

This capability describes the connection of farmer-breeders with a beyond-reality source of meaning connected to seeds, including cultural or religious ceremonies involving seeds. This can mean to experience seeds themselves as a part of spirituality or connecting one's religious belief meaningfully with seeds and practices.

#### *MASIPAG*

Many farmers in the Philippines in general are religious and most are spiritual (MAS CP2; MAS CM2; MAS FB3/FB4). One of MASIPAG's norms is that 'seed is sacred' – and should therefore not be sold (MAS CP2; MAS ST2). The network's coordinator reflects on why this norm is easy for farmers to understand and adhered to throughout the network:

“I really find MASIPAG farmers have a high level of spirituality. And that's why it's easy for them to embrace the concept of the seed is life and life is sacred. And therefore, seeds are sacred. And I shouldn't be commodifying it. I haven't heard any farmer complain about that policy.” (MAS CP2: 124)

This assessment is backed by farmers connecting or supplementing their religious beliefs with the practices they follow in MASIPAG (MAS FB3/FB4; MAS FB7/FB8). For example, organic farming practices are described as a practical application of the religious norm 'do unto others what you want others to do to you' (MAS FB7/FB8).

Spirituality around seeds also develops through understanding the mutual dependency between farmers and seeds described in *Capability 9: personal connection to plants* (MAS CM2; MAS FB3/FB4; MAS FB7/FB8). It is further encouraged by the importance and ritual or ceremonial nature of seed exchanges in MASIPAG (MAS FB3/FB4; MAS ST2).

In a wider sense, the former coordinator has heard farmers refer to MASIPAG's practices and norms as a way of life (MAS CM2).

Two **critical remarks** are made regarding the capability. First, while a spiritual dimension is generally recognised among the interviewees, one staff member stresses that MASIPAG is not religious and only offers practices (MAS ST1). Few farmer-breeders connect their seed practices to their religion, but that is a personal preference and not inherent to the network's training or codes of conduct.

Second, while it is a prime and somewhat spiritual norm of MASIPAG that seed should not be commodified, it is neither followed religiously, nor always sanctioned if violated. The coordinator explains this with an example: if a farmer needs to aid a neighbour after a calamity by providing them with enough seed to replant their farm, it would be a large financial burden for the farmer to give that amount of seed for free, yet refraining from giving seeds (as would be MASIPAG's norm) and selling them, would be considered unsocial and impolite. Neighbourhood help needs to remain possible and may override the seed norm in specific cases (MAS CP2).

No **furthering** of the capability is mentioned.

#### *Kultursaat e. V.*

Kultursaat's farmer-breeders are familiar with the idea of spirituality in and through plants. In an intellectual take, one interviewee points to historical connections of plants and spirituality and quotes certain Latin plant names as evidence (KS FB2).

Mainly, however, the farmer-breeders experience first-hand spiritual relationships with plants. *Capability 9* already describes how plants are viewed as family-members (KS FB5), which is also mentioned in answers to this question. They are seen as role models (KS FB5) and beings, humans can learn from and through, for example in the way they connect earth and sky or in how to treat any fellow creature (KS FB5; KS FB7). This sort of spiritual perception brings humans and plants on the one level as sentient beings where both can learn from each other. Farmer-breeders also reference the life cycle of plants. They describe the plants they see as only a picture of a moment in time, knowing they will grow into something different – plants stand for a small part of something bigger (KS FB1). Similarly, is the reverence members feel for a whole plant growing from a tiny seed, which to them feels as though they are holding the origin of life in one's hands (KS FB1; KS FB6).

Spirituality is also understood as sense-making by respondents. What to do with one's life is answered through breeding and seed stewardship for some of Kultursaat's members (KS FB8; KS FB7). While another interviewee takes the

opposite approach, explaining that anything one engages with as intensely as Kultursaats breeders do with plants, will gain importance for oneself in a spiritual way (KS FB10).

Kultursaat creates an environment where farmer-breeders are encouraged to adopt spiritual practices. This includes plant meditations (KS FB4; KS FB9). Also, turning breeding from an altering to a listening practice, where plants bring their own ideas and breeders help by picking up on them (KS FB6). One breeder describes the instance of envisioning what could become of a plant after breeding not as a creative, but spiritual moment (KS FB10), fuelled by an openness to the process and an intimate personal connection to the plants in question. Farmer-breeders describe their motivation to take these more spiritual approaches as wanting to dive into the plant's essence (KS FB1; KS FB9).

**Critical remarks** are made for this capability. One breeder points out that while this is a uniquely individual question, they themselves have no spiritual connection regarding plants (KS FB3). Another member specifies that they do have a spiritual understanding of plants, but religious belief is not relevant (KS FB6). In a similar vein, a third and fourth say that single varieties have no spiritual meaning for them, but working with them does (KS FB1); that they feel an individual appeal to some plant varieties, not others; and they are unsure if that counts as spiritual (KS FB4).

All in all, spirituality is understood differently amongst Kultursaat members. Some relate to the concept, others do not. Aspects they mention fit to the capability's definition, such as feeling that plants are symbols of life. Other facets, like learning life-lessons from plants is based less in a beyond-reality source of meaning (as the capability definition describes it), but more in pragmatic observation, thereby **furthering the capability**.

#### *Findings for both organisations*

Several **capabilities are mentioned which link** to spirituality and religion. Most often, *capability 9: having a personal connection to plants* (MAS CM2; MAS FB3/FB4; MAS FB7/FB8; KS FB4; KS FB9) is quoted. Interviewees either say that their connection to plants is spiritual to them or explain that because farmers have a general spiritual outlook, they connect to plants. Also referred to several times is *capability 8: giving and receiving support and respect* (MAS CP2; KS FB9; KS FB7), as spiritual practices perpetuate in community. Mentioned once is *capability 1: control over one's economic future*, as MASIPAG's seed exchanges (which ensure diversified low-cost farming) are described as ceremonial (MAS FB3/FB4). *Capability 7: psychological*

*well-being* is mentioned, as spirituality is an ingredient for psychological well-being for one farmer-breeder (KS FB8); as well as *capability 3: sharing of (seed) knowledge*, as exchanging knowledge on spiritual plant matters is important to a breeder (KS FB9); and *capability 5: creativity and critical thinking* (KS FB6), as breeding is viewed as listening to plant's ideas, as described several times before.

### **Capability 11: beauty in life**

Beauty in this capability describes both appreciating beauty as any intense engagement of senses and knowledge with seeds, plants, or nature, yet also beauty in working in and with nature. By asking "how does working with MASIPAG's seed commons bring beauty into your life?", there is a lot of room left for spontaneity and interpretation in interviewees' answers.

#### *MASIPAG*

MASIPAG's members find **beauty in plants and nature**. On a direct level of aesthetics, organic farms are regarded as being aesthetically beautiful (MAS CP2), experiencing diversity as beauty (MAS FB3/FB4). Farms are described as sanctuaries of wildlife (MAS CP2) or even bringing back paradise (MAS CM2).

On a deeper level, the connection to life through working in unison with plants as living beings is experienced as beauty. Farmers say that watching a plant's life cycle is beautiful as it is a realisation of the gift of life (MAS FB3/FB4): "If you help in the propagation of a single life, you feel the beauty of life within you." (MAS FB3/FB4: 344).<sup>178</sup> This links back to the connection between seeds and farmers and beauty, as directly mentioned in this context:

"The farmer needs the seed and the seed needs the farmers. The seed and the farmer are inextricably linked. We cannot separate them when it comes to farming, so that brings beauty into their life." (MAS CM2: 114)

Beauty is also experienced in **work and life** for farmer-breeders. First and foremost, as described in *capabilities 1 and 7*, being self-sufficient and having seeds is felt to be empowering and beautiful (MAS CM2; MAS FB3/FB4; MAS FB7/FB8; MAS ST2). The network's members also describe various

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<sup>178</sup> In contrast to the respectful and cooperative view organic farming applies to plants and nature, conventional farming practices build on competition and involve killing of (beneficial) insects and non-crop plants (MAS CP2). "They [farmers] know it in their heart" (MAS CP2: 128).

positive feelings associated with MASIPAG's practices as beautiful: they find beauty in sharing (MAS CP2) and in being empathetic with others (MAS CM2), in being appreciated for the things one does (MAS FB5/FB6), and in being debt free and able to provide for a family (MAS FB5/FB6).

In general, MASIPAG farmers are proud of what they are doing (MAS CM2). They are both proud of their self-sufficiency as organic practitioners and proud of defending oneself, all farmers and farming culture in general, against corporate commodification (MAS CM2).

Neither **critical remarks** nor any **furthering** of the capability are reported.

#### *Kultursaat e. V.*

Kultursaat's breeders experience **beauty of plants and nature**. There is an agreement amongst them that plants are beautiful (KS FB5; KS FB2; KS FB9; KS FB1; KS FB6; KS FB7). They are described to have their own gestures (KS FB2), which reveal themselves if one has time to look closely (KS FB2). This is described in the way plants open and close their flowers, giving themselves trustfully to their environment, absorbing it and closing back in on themselves to produce new life (KS FB2). Breeders describe how they are still in awe, feeling like children again when looking at plants (KS FB8; KS FB4). One member is inspired to see their full lifespan and how they give their all (KS FB4).

Besides their particular love for plants, interviewees mention the beauty of nature (KS FB10), seeing life itself through their work with plants (KS FB6) and the beauty of biodiversity (KS FB7).

Breeders also find **beauty in their work and life**. Most of all, it is beautiful to work with plants (KS FB5; KS FB1; KS FB6; KS FB7). It is elating if plants grow well under one's care (KS FB2) and rewarding in the moments where one sees the fruits of one's labour (KS FB3). Respondents enjoy engaging with plants intensively (KS FB4), as engaging intensively with anything is beautiful (KS FB6). Personally, they find it rewarding to take responsibility for global biodiversity (KS FB7). A second emphasis is put on the beauty of communal work and exchange in the association (KS FB3; KS FB10; KS FB7), and being part of a community, which shares one's values (KS FB10).

No **critical remarks** nor any **furthering** of the capability are reported.

### *Findings for both organisations*

Several **capabilities link** to the experience of beauty in one's life. Only mentioned once are *capability 1: control over one's economic future* (MAS FB5/FB6) and *capability 3: sharing of (seed) knowledge* (MAS CP2). Stronger links exist between beauty in life and *capability 8: giving and receiving support and respect* (MAS CM2; MAS FB5/FB6; KS FB3). Members of both organisations experience it as beautiful to have the support of a community who shares their values. For MASIPAG in particular, *capability 10: spirituality*, is also connected to this capability (MAS CP2; MAS CM2; MAS FB3/FB4), in the way plants and humans are dependent on each other and natural cycles are balanced out. It is also connected to *capability 7: psychological well-being* (MAS CM2; MAS FB5/FB6), because having no debt contributes to beauty in farmer-breeders' lives. Specifically, for Kultursaat there is a connection to *capability 9: connection with plants* (KS FB4; KS FB2; MAS CM2), as plants are beautiful in close observation, and being able to engage with them intensely is personally rewarding.

### **Two More Capabilities: Community & Sustainable Future Vision**

In describing the findings for all capabilities in detail, it becomes clear that members of both organisations repeatedly mention two aspects, which do not precisely fit any of the capabilities in the existing list. As they are important to the farmer-breeders, I add them as two further, inductive capabilities. *Capability 12* represents living in community and a concern for communities. *Capability 13* describes working for a worthwhile future for following generations, both as a normative motivation and personal reward for action. These two inductive capabilities are described differently to the others, as they have no previously written description for reference. Instead, I report how farmer-breeders refer to community and a future sustainability vision. From that, I formulate a description of *capabilities 12* and *13* in the discussion.

### **Capability 12: living in and with concern for community**

MASIPAG's farmer-breeders describe various community aspects as being relevant to them. First, MASIPAG explicitly promotes community in their training and through the PO trial farms (MAS FB1/FB2; MAS ST1), to teach "the importance of having an organisation rather than being an individual farmer" (MAS FB1/FB2: 371). Knowing how to contribute to a community is a motivation for the network's members (MAS FB3/FB4; MAS FB5/FB6). Farmers themselves value the communities they feel part of, which is often not only MASIPAG, but also their independent PO, their neighbourhood, and so

on.<sup>179</sup> They can turn to their communities for emergency help (MAS FB3/FB4), but also provision of knowledge, practical help with farming chores and moral support (MAS FB3/FB4). In turn, they are willing to put their own best interest behind that of the group if need be, to assure coherence. For example, farmers describe standing behind any decision their PO deliberates (MAS FB5/FB6). On the other side, farmer-breeders themselves contribute to their communities. Mainly, in giving other farmers access to seeds (MAS FB1/FB2) and providing them with more and better varieties (MAS FB5/FB6), as they see it as everyone's responsibility to maintain seeds and be able to replenish them in case they are lost to individual farmers, or other regions (MAS FB3/FB4). Unique to this capability, it is (almost) only farmer-breeders themselves, who stress community aspects. Coordinators and staff do not refer to aspects of community support, pride or belonging.

**Kultursaat** breeders cherish the transparent exchange with their association fellows to learn, develop ideas and provide society with better varieties than they could as individuals (KS FB3; KS FB2; KS FB10). On an emotional level, they find beauty in this exchange (KS FB3; KS FB7; KS FB10). When referring to community, however, the breeders do not only mean Kultursaat. They are just as likely to refer to non-association members with the same ideals, values, and goals (KS FB8; KS FB2), and the human community in general (KS FB5). Also, they view themselves as building on the past community of farmers who have been developing varieties and carrying this legacy on into the future by providing for the community of coming generations (KS FB8; KS FB7). In this sense, community helps Kultursaat breeders to experience place and belonging.

Farmer-breeders of **both organisations** spontaneously emphasise community aspects. They also both refer to aspects of giving and receiving and having a sense of communal responsibility towards current and future people regarding seeds. MASIPAG's farmer-breeders consistently refer to community aspects, while not all Kultursaat breeders mention it. Furthermore, MASIPAG's farmer-breeders describe mostly practical support and belonging as notions of community, while Kultursaat breeders take a moral and quality-of-life standpoint.

Several **capabilities link** to *capability 12*. Most reference is made to *capability 3: sharing of (seed) knowledge* (MAS FB7/FB8; MAS FB5/FB6; KS FB10; KS FB2). This practical effect of community practice is closely linked to *capability 8: giving and receiving support and respect* (MAS FB7/FB8;

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179 One farmer describes it as all farmers who "share the same passion of preserving seeds" (MAS FB3/FB4: 47).



MAS FB3/FB4; MAS FB5/FB6; MAS FB1/FB2; KS FB2), which is likewise stressed. Further, aspects of belonging touch on *capability 7: psychological well-being* (MAS FB7/FB8; MAS FB3/FB4; KS FB8). Also, one MASIPAG and one Kultursaat farmer-breeder perceive community as improving *capability 4: excellence at one's job* (MAS FB7/FB8; KS FB3). A farmer-breeder sums it up:

“I feel that I become a better farmer when I'm in MASIPAG because they acknowledge us. Our ideas. And I always share it with other farmers. We are proud to be part in MASIPAG.” (MAS FB7/FB8: 174)

Kultursaat breeders furthermore describe community as giving them beauty in life (*capability 11*; KS FB3; KS FB7). As they perceive future generations as one group they are responsible for, *capability 13: working for a human(e) future* (KS FB8; KS FB7) also connects. This is the capability described next.

### **Capability 13: working for a human(e) future**

In **MASIPAG**, the needs of future generations are kept in mind and farmer-breeders feel a responsibility to preserve seeds for them (MAS FB3/ FB4).

“It's not seed production. And our work ... it's more on we go 20 years, 30 years from now, we are looking forward, we are preserving the seeds not only for us but for the future generation. For our ... for genetic resources, for our members, for our next generation, for the community and as a whole for the country.” (MAS FB3/FB4: 206)

This notion of social sustainability for a “just and humane society” (MAS ST1: 11; also, MAS CM2) is coupled with awareness for social-ecological sustainability in the face of climate change. Organic agriculture (MAS FB1/FB2; MAS FB3/ FB4; MAS CP2; MAS CM2) and new breeds (MAS CP2) are mentioned repeatedly as a means of preserving the environment and achieving climate resilience. This future vision is mostly described by MASIPAG's former and present coordinators and staff. Farmer-breeders themselves focus on the present accessibility of seeds for their communities and current farmers.

The farmer-breeders of **Kultursaat** feel a responsibility for seed preservation (KS FB8; KS FB7; KS FB5) for other farmers and societal well-being. This includes breeding naturally resistant and climate change resilient seeds, so future generations are still able to grow a diversity of nourishing food (KS FB5). Farmer-breeders say that they have:

“a collective responsibility for crop plants, [responsibility] for our earth, for humanity, but also for the following generations. And also, a responsibility for the heritage we are already preserving from others” (KS FB7: 7)

This moral responsibility stems from the knowledge that today’s farmer-breeders are part of a historic succession of farmer-breeders and are the ones to ensure that the agrobiodiversity developed by former generations is maintained for the next generation (KS FB8; KS FB7; KS FB2). For today’s humanity, they strive to ensure regional food and seed sovereignty (KS FB2; KS FB8; KS FB7). All these moral obligations are transferred to young breeders through informal, value-based teaching (KS FB10).

MASIPAG and Kultursaat have **similarities and differences** regarding *capability 13*. Farmer-breeders from both organisations perceive a responsibility to preserve and enhance agrobiodiversity for future generations, as well as building up and preserving present seed sovereignty for current farmers. A moral concern for the future is more established in Kultursaat, while MASIPAG’s farmer-breeders emphasise present reciprocity, support, and solidarity. Both describe a more humane seed system. Compared to the other capabilities, this one is less widely backed by the interviewees as a capability, but rather a motivation for continued action.

**Linking capabilities** to this one are sparsely mentioned. They are *capability 3: sharing of (seed) knowledge* (KS FB10) and *capability 7: psychological well-being* (KS FB8).

Overall, the findings show that most farmer-breeders find aspects of all capabilities in their work. Most present for both organisations is *capability 3: sharing of (seed) knowledge*. MASIPAG’s farmer-breeders furthermore emphasise *capability 1: control over economic future*, while Kultursaat’s farmer-breeders find *capability 5: creativity and critical thinking*, *capability 9: personal connection to plants* and *capability 11: beauty* in life especially important. More on this in the following paragraphs. Farmer-breeders repeatedly mention community and concern for future generations, which are added to the capability list as *capability 12* and *13*.

### **Weighting of Seed Commons Capabilities**

While farmer-breeders agree overall that the eleven identified capabilities are relevant to their work with seed commons, they weigh their importance differently. At the end of each interview, the respondents are asked which three capabilities are most important to them and which one capability they feel is

least important. Answers are collected and depicted in *Table 3* below. To the left of the table are the interviewees, the capabilities are listed on top. Positive answers (‘Which three capabilities are most important?’) are coded green, negative ones (‘Which capability is least important?’) in orange. Specific attention is drawn to the four MASIPAG farmer-breeder interviews (MAS FB1/FB2; MAS FB3/FB4; MAS FB5/FB6; MAS FB7/FB8): As they are conducted in pairs, each interview yields two sets of most and least important capabilities. Where they agree on a capability, they are indicated in darker green or orange. The total of answers shows how high a capability is valued by calculating positive and negative perceptions against each other. The lowest two rows show the counts of positive and negative answers.

		1- economic future	2- political participation	3- knowledge sharing	4- job excellence	5- creativity & critical thinking	6- health	7- psychological well-being	8- support & respect	9- connection with plants	10- spirituality & religion	11- beauty in life	12- community	13- sustainability
MASIPAG	MAS CM 1 & 2	1												
	MAS CP 1 & 2													
	MAS ST1													
	MAS ST2													
	MAS FB1 / FB2	1	-1	1	1	1	1	-1	1	1	1	1	1	
	MAS FB3 / FB4	1		1	1	1	1	-1	1	1	1	1	1	
	MAS FB5 / FB6	1		1	1	1	1	-1	1	1	1	1	1	
MAS FB7 / FB8	1		1	1	1	1	-1	1	1	1	1	1		
Kultursaat e. V.	KS FB1	-1												
	KS FB2													
	KS FB3													
	KS FB4													
	KS FB5													
	KS FB6	-1	1											
	KS FB7													
	KS FB8	1		1	1	1	1	1	1	1	1	1	1	
	KS FB9		-1											
	KS FB10	-1		1										1
<b>total</b>		<b>5</b>	<b>2</b>	<b>7</b>	<b>1</b>	<b>9</b>	<b>7</b>	<b>-1</b>	<b>4</b>	<b>7</b>	<b>1</b>	<b>11</b>		<b>1</b>
positive answers		8	4	8	4	9	9	6	4	8	1	12		1
negative answers		-3	-2	-1	-3	0	-2	-7	0	-1	0	-1		0

*Table 3:* Weighting of seed commons capabilities according to interview responses. Source: Own depiction

Judging from total scores, the most valued seed commons capability is beauty in life (*capability 11*), followed by creativity and critical thinking (*capability 5*). Knowledge sharing (*capability 3*), physical health (*capability 6*) and connection with plants (*capability 9*) all share third place.

Least valued is psychological well-being (*capability 7*). It is mainly disregarded by MASIPAG members, which might partly be a methodological problem, as described in the methodology discussion chapter 6.1 *Discussion of Theory Strands on Well-Being and the Capability Approach* below, as farmer-

breeders try to express the fact that they do not fear the repercussions they face for their involvement with the network. Excellence in one's job (*capability 4*) and spirituality and religion (*capability 10*) are likewise judged as less important. Working for a humane future (*capability 13*) is a special case. It is only listed as important once, but at that stage of the research, it had not been included in the capability list, and was mentioned by an interviewee spontaneously.

This chapter demonstrates that the listed capabilities were well received amongst farmer breeders in both Germany and the Philippines. What that means for each capability, for the application of the capability approach to seed commons and for a contribution to commons theory is discussed in the following chapter.



## 6 Discussion of the Findings

*In what way do seed commons influence farmer-breeders' individual well-being, visible in the capabilities they enable or inhibit?* – That is the research question of this thesis, and its answer is the focus of this chapter. The first sub-question is concerned with the application of the capability approach to seed commons and is already answered in chapter 3.2 *The Capability Approach for Seed Commons*. Questions two and three are answered here: 2. How are those capabilities met by seed commons in circumstances of affluence (Kultursaat e. V.) and scarcity (MASIPAG)? and 3. What does that imply for goods and their ownership modes in general?

I discuss my findings in several steps, starting with an interpretation of the answer to my research question, if and how seed commons influence farmer-breeders' well-being. This first, empirical discussion in chapter 6.1 includes which strands of well-being are achieved by farmer-breeders, which similarities and differences are found for seed commons in conditions of affluence and scarcity, a detailed discussion of each of the thirteen capabilities and a literature background for capabilities twelve and thirteen.

In the second part (chapter 6.2), seed commons and their relation to the thirteen capabilities are discussed conceptually. It argues how structural characteristics, for example practices and values, reflect in capabilities, and how they determine or inhibit them. For example, capability 8, *giving and receiving support and respect*, is especially linked with the commoning aspects of seed commons, which stress *horizontal relationships in the present*. Implications for the capability approach, seed commons, the design of commons institutions and private property regimes are drawn from these insights.

Thirdly, a final rephrasing of the capability list for seed commons is presented in chapter 6.3, which takes findings from the interviews and the discussion of them into account.

Finally, a discussion of methodology in 6.4 completes the chapter, mainly explaining differences in data acquisition between Germany and the Philippines.

## **6.1 Discussion of Theory Strands on Well-Being and the Capability Approach**

Farmer-breeders from both MASIPAG and Kultursaat relate to the seed commons capabilities. The findings reported in chapter 5 above are interpreted in light of the capability approach in this chapter.

### **Is well-being achieved for farmer-breeders?**

Overall, the capability approach is adequately applied, and well-being is achieved by farmer-breeders. Farmer-breeders relate to the capabilities and feel like they achieve a range, from several to most of them, through their work with seed commons. Depending on personality and context, single capabilities are less relevant to individual farmer-breeders (see *Table 3* in Chapter 5 *Findings*). As well-being is considered to be determined by individual needs and preferences in the capability approach, this is to be expected. Even if not all farmers relate to all capabilities, as many capabilities as possible should remain in the list, to give a broad picture of possible capabilities (some to most) farmers feel are achievable through seed commons.

### **Differences for seed commons capabilities under conditions of affluence and scarcity**

The thirteen capabilities are regarded with different intensity by farmer-breeders of MASIPAG (scarcity conditions) and Kultursaat (affluent conditions). The relative importance of the capabilities becomes obvious in the number of interconnections drawn between them.

Practical capabilities (such as economic security, political influence, and knowledge sharing) seem to be more important in the Philippine context, as MASIPAG members also frequently mention these capabilities when asked about other capabilities (interconnections). Kultursaat members tend to be brief in their answers and not talk much about economic and political aspects in the follow up. On the other hand, some of the later, less palpable capabilities are more connected to other capabilities and regarded as motivating by Kultursaat. One possible interpretation of these findings is that seed commoners have the freedom to place emphasis on value-based capabilities once the baseline capabilities are fulfilled. For Kultursaat's farmer-breeders, for example, baseline economic security is provided via their commercial farming activities and state social security schemes, if need be. They interpret *capability 1* as profit maximization, and hence disregard it as less important for them.

One more point which stands out for MASIPAG is that coordinators either mention capabilities as central, or disregard them, whereas farmer-breeders view them differently. This is striking for *capability 11: beauty in life*, which coordinators view as less relevant in contrast to knowledge sharing (*capability 3*), economic security (*capability 1*) and health (*capability 6*), while farmer-breeders emphasise it throughout. This might be due to the differing conceptual lens of the coordinators, in terms of what the network is supposed to achieve for its farmer-breeders and their living understanding of what it does achieve for them i.e., more overall well-being, which they perceive as beautiful.

### **From economic thriving to beauty in life: Discussion of capabilities 1–11**

Findings **for each capability are discussed** in the following. The interview responses are connected to the background knowledge established in chapters 2 and 3 and put into context.

#### *Capability 1: control over one's economic future*

All the interviewed farmer-breeders can relate to *capability 1*, as being relevant in their work with seed commons. Their answers in regard to what that capability entails, however, regularly exceed the definition in detail and depth. MASIPAG's farmers in particular, connect this capability to various others, highlighting its centrality. The different interpretations of the capability by MASIPAG and Kultursaat members, illustrate how capabilities are specific to social and environmental contexts.

MASIPAG's members do not emphasise the actual possession of seeds (now), but the building of capacity to remain in control of their farming sustainably, including empowerment for seed sovereignty. Their answers show that this has far-reaching biological-technical, social-organisational, cultural and personal facets, as *capability 1* connects to knowledge sharing, political influence, physical and psychological health, support, respect, community, and further capabilities for them. Under conditions of scarcity, which allow small-scale farmers to farm for subsistence, seed sovereignty means food security. To ensure the continued realisation of *capability 1*, several other central capabilities (as well as the value base and practices) are modelled into a support system for it.

MASIPAG's coordinator expresses disappointment about the disinterest in breeding exhibited by most farmers, although training is available and conducted. This being said, it is the network's perspective on what would be desirable for members to have control over their economic future. The farmers involved with MASIPAG are apparently content with their *capability 1*, if they



see no need in breeding themselves – they have both tools and theoretical knowledge, should they decide differently in the future.

Matters are different for Kultursaat. It becomes apparent in the findings that achieving control over one's economic future is seen as being somewhat critical (understood as profit-orientation), or at least a bias held by Kultursaat's members. For many of them, their personal economic future is detached from their breeding. This is due to German seed regulation, which prohibits seed saving for vegetables in commercial agriculture on the one hand, and the relative affluence of the farming trade in central Europe on the other. With a social system and the possibility to change jobs, subsistence farming is not an issue and seed sovereignty is more morally rather than personally relevant. The question around *capability 1* for Kultursaat's members is more 'How do I want to work?' rather than 'Do I have enough to live?'.

A brief summary of **similarities and differences between MASIPAG and Kultursaat** for this capability, starts with the fact that members of both organisations generally refer to this capability. Yet it becomes obvious that being capable of controlling one's economic future through seed commons is more central for members of MASIPAG and means different things to both organisations. While all interview partners respond to the question, the volume of answers by Kultursaat is a mere half of MASIPAG's. Kultursaat members are also more critical of whether this capability applies positively to their breeding and farming experience. As a central feature of MASIPAG, being capable of controlling one's economic future is intricately entwined with other capabilities. These links did not concern Kultursaat members.

Looking at the description of *capability 1* in chapter 3.2 *The Capability Approach for Seed Commons*, most aspects are mentioned by both or at least one of the organisations. This means that the general description and fit to seed commons is achieved. However, views of actors in affluent circumstances, such as Kultursaat's farmer-breeders, are underrepresented. From critical comments and further points mentioned by the interviewees, financing strategies for formalised breeding need to be added to the capability. The description is largely based on a traditional commons view of securing one's livelihood. For Kultursaat's members, moral global commons aspects gain relative importance, which means the preservation of biodiversity for the economic future of future generations'. As this is elaborated in *capability 13*, it can only be touched upon in the description of *capability 1*. From MASIPAG's side, it becomes clear that knowledge aspects and wider sovereignty over production inputs need explicit mention in *capability 1* as well. Seed sovereignty is impossible without sufficient explicit and tacit knowledge and while knowledge is

the topic of *capability 3*, its role for economic control needs to be made clear in *capability 1*.

*Capability 2: participation in political decisions*

Compared to the first capability, this capability on political decisions is mentioned less and to different extents from one interviewee to the next. In MASIPAG, it is noticeable that coordinators are more likely to report on political motives and actions than farmers. It is somewhat unclear how many of the farmers engage in farming politics, as the interviews are mostly conducted with farmer-leaders from POs and PCBs, who might be more politically engaged than the majority of MASIPAG's members. What becomes clear in any case: Through MASIPAG as a network encouraging local political action, farmers are able to take political influence and shape farming environments for regional farmers within and beyond MASIPAG.

This points to a shortcoming of the data.<sup>180</sup> While factual political actions are reported, what is interesting is how political power shifts through engagement in seed commons. In conventional agricultural systems, power lies with the providers of farming inputs and loans. In the seed commons regime, power is levelled between farmers and surrounding actors. Farmers do not only hold tacit knowledge but transfer it into scientific knowledge through formalisation and knowledge exchange (professionalisation). It gives farmers confidence and encourages them to politically position themselves in their communities. Taken as a whole, MASIPAG's professionalisation through scientific knowledge collection and research cooperation, positions the network as an expert for organic farming and community empowerment even up to national level.

What is missing from the capability description and needs to be included is network-internal political voice, which MASIPAG's farmer-breeders especially emphasise. The self-organisation via the system of representatives, where thousands of farmers deliberate how the network develops is perceived as politically valuable by the farmers. The network's members hence, do not only engage in political action and encourage others to do so, but see MASIPAG as political.

Kultursaat's farmer-breeders, on the contrary, relate less to *capability 2*. This might be a problem of the selection of interview partners, as farmer-breeders themselves are interviewed and not the association's coordinator, who might

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180 That the power aspect is not emphasised might be a shortcoming of the capability description, where it could be put more centrally, but also possibly the formulation of the interview question.

be more directly engaged in political action. On the other hand, Kultursaat is much smaller and many of its current members are founders of the association. Political power to shape Kultursaat and act politically in public resides directly with the farmer-breeders (unlike MASIPAG, where the network size requires a layered representative system for self-organisation).

What Kultursaat's members view as political is their breeding. The logic: If more and more farmers decide to use organically bred seeds instead of conventional (organic) seeds, that will automatically gain political momentum against the current agricultural system.

There are some **similarities and differences between MASIPAG and Kultursaat** when it comes to the degree of political influence. Filipino farmers stress and value being able to decide on any of their farming modalities and having a voice within their network. These aspects are not mentioned as relevant by any of the German breeders, although they objectively have wider privileges in that regard. Other than that, the two organisations are similar in many respects. Both report that living an alternative is their central political act and statement. Also, both organisations have been gaining nationwide reputation for their work and are contacted as experts by political entities, which gives their members a sense of indirect political influence – seeing their values represented in society.

Participating in decision making is part of traditional and global commons theory as well as commoning. For traditional commons it is stressed that commoners deliberate and determine their maintenance of the commons, which both MASIPAG's and Kultursaat's members do (even if Kultursaat's farmer-breeders do not feel that aspect worth mentioning); the first in a multi-layer representative system; the latter in bi-annual association meetings. Global commons also have the element of commons-internal political deliberation but add political representation of the resource and its importance to the public and decision makers. For the case studies this is visible in the promotion of agrobiodiversity and organic agriculture, as well as lobbying against GMO use by both organisations. They do this via transparency in breeding, campaigns, participation in scientific conferences and meetings with politicians and lawmakers. Finally, commoning stresses processual aspects of political work, such as the continued deliberation of rules, the adaptation of rules and values over time, and the political character of commoners' practices. That Kultursaat views their breeding as political, and MASIPAG their open seed sharing, are examples of these political commoning aspects.

### *Capability 3: sharing of (seed) knowledge*

The sharing of knowledge about seeds, organic farming and community aspects are dear to both MASIPAG's and Kultursaat's farmer-breeders. In fact, they discuss it so ardently that a part of the discussion has been applied to the findings already, to help structure them: while the capability description talks about gaining and sharing knowledge, farmer-breeders of both organisations point to producing knowledge as well. This is especially relevant as it is often tacit knowledge that is produced, which cannot easily be conceived from external sources, but needs to be learned by each farmer-breeder themselves. Examples are the interplay of specific crops and varieties on MASIPAG's diversified organic farms, or the feeling for which plants to select in breeding which Kultursaat's farmer-breeders call the 'breeder's eye'. Producing knowledge, as it is described, is an experiential and experimental approach to farming and breeding which cumulates in personal farming expertise and skill over time. It can only be formalised in part, as it ultimately needs to be experienced and adapted by the person who learns it, to become practical and valuable farming and breeding knowledge. Knowledge production should thus be added to the capability description.

In MASIPAG's description of the capability, it becomes clear that knowledge links need to be kept intact to produce relevant knowledge. This means that seeds are shared, together with the information on how to seed-save. Also, that any knowledge is encouraged to be used by farmers, experimented with, and adapted to keep its links with their farms, environments, and cultures intact, or adapt them to create new knowledge. Knowledge is thus embedded in context to be relevant for (seed) sovereignty. To maintain this embedding, gaining, producing, and sharing knowledge necessarily flow into each other. Gaining knowledge without applying it, adapting it, and thereby producing (at least some) knowledge specific to one's circumstances, would mean to merely gain theoretical, empty knowledge. Gaining knowledge from others means to share one's own to keep the ties of reciprocity intact, which enables gaining knowledge from others in the first place. Finally, knowledge sharing is taken as an opportunity to get feedback on developed technology and insights, which helps to refine that knowledge (a form of knowledge production). Knowledge sharing is thus the engine of MASIPAG's integrated knowledge gaining and production and no barriers are attached to it (save to share with institutions who might restrict further open sharing).

In Kultursaat's accounts of the capability it is striking that almost no instances of formalised knowledge sharing are mentioned, but the focus lies on in-depth and personal, informal knowledge exchange. Farmer-breeders describe it as a

freedom to be able to venture into anthroposophical<sup>181</sup> and existential-philosophical knowledge as a community. In their affluent, professionalised context, tacit, non-efficient and personal experiential knowledge is usually disregarded. To be able to (re-) integrate it in one's profession is perceived as a valuable, special quality of Kultursaat's practices.

An example of this knowledge is the notion of learning from plants, which is mentioned by several farmer-breeders.<sup>182</sup> They refer to a personal knowledge formation through a continued engagement with their plants (or a specific crop) over the years. In the findings, I have listed it as *gaining* knowledge from plants, because this is closer to how the farmer-breeders describe this plant-human process. In common Western thinking, it would likely rather be described as *producing* knowledge from the interaction with plants. Ultimately, the distinction is an ontological one: Does the plant teach as a subject and breeders learn to understand, or is it the breeders' observations of plants as objects and their own conclusions that condense into new knowledge? In this, a different way of relating to plants becomes apparent; a notion that is included in commoning theory as the deliberation of relations between humans and nature.

There are **similarities and differences** between MASIPAG's and Kultursaat's outlook on this capability. The organisations place a different emphasis. For MASIPAG it is important that seeds and seed practices are never treated separately, in order to regain seed sovereignty for each individual farmer and their communities. Farmer-empowerment through propagation of semi-scientific knowledge is key, where farmers have been stripped of professional knowledge by increasingly mechanised and pre-configured conventional farming methods, and existing knowledge is not considered salient. The exchange members primary report, centres around professional questions regarding seeds and organic farming practices. Kultursaat, on the other hand, emphasises personal value-exchange next to professional knowledge sharing. The embeddedness of working in a group is an experience they cherish. Their empowerment works using not more, but less formalised knowledge types. An example of this more personal, humanised and spiritual knowledge, is the view of plants as teachers. Seed sovereignty is desired for all Central-European farmers, instead of the breeders within the network. While one organisation works towards scientific understanding and the other one emancipates from

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181 Which, at least from the researcher's point of view, has almost spiritual dimensions.

182 All mentions of learning from plants are made by female breeders, which could just be a coincidence due to the limited number of interviews.

mechanistic scientific knowledge, both MASIPAG and Kultursaat are living examples of the integration of various and new forms of knowledge.

On a meta-level, MASIPAG and Kultursaat share similarities. First, in both networks the excitement and ardency farmer-breeders hold for their work, blurs the lines between formal and informal knowledge exchange when farmers meet. Both associations emphasise in their critique, that in conventional agriculture knowledge is privatised, while they can share it freely. Transparency, as well as attitudes of sharing and mutual help prevail in both organisations. Second, integration of different knowledge forms is mutually practiced, combining scientific evidence with experimentation and experience-based personal knowledge. Most strikingly, however, gaining, sharing and producing knowledge, mix to an extent where they are not thought of separately by farmer-breeders. It is clear to all of them that sharing knowledge also means gaining new knowledge oneself and the resulting discussion is likely to refine and produce knowledge, which can then be shared again. Knowledge sharing (*capability 3*) and community practices (*capability 12*) frequently merge in farmer-breeders' descriptions, giving the two capabilities a special bond.

The centrality of *capability 3* in the seed common concept is visible in the many interconnections this capability has with the other capabilities, as described in the findings. That knowledge sharing aspects are central to seed commons, is also described by Sievers-Glotzbach et al. (2020). The creation, maintenance and sharing of knowledge is especially visible in knowledge commons. Norms around seed and knowledge sharing, structure and strengthen seed commons communities. For MASIPAG, it is the notion that seed is not to be sold but shared along with seed knowledge (MASIPAG orientation). In Kultursaat it is transparency about breeding in, and outside of their group, as well as the free training of breeders. In this way, these knowledge commons aspects of seed commons are a main pillar of the seed sovereignty attained by farmers.

#### *Capability 4: excellence at one's job*

Although the majority of farmer-breeders relate to this capability, they do so in a different way than was intended. The capability is meant to describe autonomy and self-expression in one's job. Farmer-breeders, however, rather describe excellence and sense, the two categories the findings are structured on. This implies that the question of *How do you become a better farmer and breeder with MASIPAG's help/through your work [in Kultursaat]? Is this important for you?* does not describe the aspects which the capability is meant to express. As a qualitative research instrument, it is not validated according to

its intended cause and needs rephrasing to ask for autonomy and self-expression more directly.

Both aspects are still referred to by farmer-breeders but in other capabilities. Autonomy is touched upon in *capability 1: control over one's economic future*, and self-expression is described in *capability 7: psychological well-being* and *capability 11: beauty in life*. Autonomy and self-expression are thus cherished by farmer-breeders. The question of excellence in one's job thus adds an unintended aspect of ability to experience or strive for excellence, which a majority of farmer-breeders relate to more or less strongly, as depicted in the findings. Other farmer-breeders cannot relate to striving for excellence and reject the idea, which makes *capability 4* one of the more controversial capabilities.

It is also apparent from the findings that the capability is not precisely delineated, as it connects to various other capabilities and, as described above, both intended core aspects are taken up in other capabilities as well. An example is MASIPAG, where farmer-breeders point to *capability 8: respect and support*, and *capability 7: psychological well-being*, in describing their ideas of excellence as farmer-breeders. It demonstrates the core beliefs and values of MASIPAG. Doing a good job as organic farmers means contributing to planetary health and social resilience, which gives a direct feeling of sense and earns others' respect. Once again, capabilities are interwoven.

There are **similarities and differences** between MASIPAG's and Kultursaat's understanding of this capability. Both organisations understand excellence as continuous learning and draw direct links to knowledge exchange (*capability 3*). It is also striking that both organisations spontaneously include sense in their descriptions of excellence (intended for *capability 7*).

It becomes clear here that MASIPAG and Kultursaat set a different focus for their main activities: while MASIPAG emphasises organic farming and seed saving for all of their members, Kultursaat specialises in breeding. Kultursaat likewise, goes beyond mastering profitable farms to creating a working environment where it is possible to live according to one's values. These differences are probably due to the different contexts the organisations operate in.

*Capability 4* is only loosely linked to commons theory. While autonomy is taken up as a value in the seed commons criteria (called seed sovereignty in this instance), self-expression and excellence are not part of commons theories. Looking at the fact that most aspects of this capability are taken up in other capabilities as well, and seeing its weak connection to commons theories, it is

debatable if the capability should be included in the capability list of seed commons or if it is superfluous. It is ultimately taken out of the final list.

#### *Capability 5: creativity and critical thinking*

This capability was originally part of *capability 4: excellence in one's job*, in the capability list. Because it seems especially relevant to seed practices and seed commons' organisation, it is split into two questions for the interviews. One is for excellence, *capability 4*, and the other for creativity and critical thinking, *capability 5*. Now *capability 5* turns out to be a precise and descriptive capability. Respondents do not connect it to *capability 4* in their answers but relate to it directly. Creativity and critical thinking could be grouped with self-expression, the aspect of *capability 4* that is less explicitly taken up by another capability so far.

The answers for this capability have little need for discussion. Farmer-breeders relate to both creative and critical thinking aspects. There are **similarities and differences** between MASIPAG and Kultursaat. One similarity is that the development of these personal skills is connected to learning from the organisation and exchange with others, for members of both seed commons initiatives.

The ways farmer-breeders relate to this capability are different for MASIPAG and Kultursaat. For MASIPAG farmer-breeders it is a tool to run their farms. Critical thinking is explicitly taught to farmers entering the network and is mentioned more frequently by MASIPAG's farmer-breeders than creativity. Kultursaat breeders relate to creativity and critical thinking equally in their answers. Kultursaat breeders are more likely to frame their answers as aspects of personal freedom, self-expression and fulfilling working conditions. They speak more ardently of this capability than do MASIPAG's members, who describe it as a useful and necessary tool for their work, and a source of emancipation.

Critically questioning current seed practices and creatively creating alternatives are aspects of commoning theory. Farmer-breeders are aware of their counter-hegemonic action in maintaining seed commons, and both MASIPAG and Kultursaat emphasise their role-model function, as alternatives to conventional seed systems, with pride.

#### *Capability 6: bodily health*

For MASIPAG's farmer-breeders, the health benefits of maintaining seed commons come from the strict organic and diversified agricultural practices



MASIPAG requires of its members. For MASIPAG, seed sovereignty is only possible in combination with organic farming, as explained above. This link, however, is debated and not included by Sievers-Glotzbach et al. (2020) in their formulation of seed commons criteria. Seed commons, as a property regime, do not necessarily need organic practices to persist, as long as no biological reproducibility restrictions are imposed on the varieties. The current seed commons empirics beg to differ, however. Both organisations strictly and non-negotiably adhere to organic practices, and view seed commons without organic agriculture, either as impossible (MASIPAG), or inconsequential and illogical (Kultursaat). At least for MASIPAG, organic agriculture ensures functioning of their seed practices (the seed commoning aspect, as far as commons theory is concerned), for example, in the importance of variety adaptation to environmental circumstances. Sievers-Glotzbach et al. (ibid.) have not thoroughly taken seed commoning into account in their conception of the criteria. Including commoning and backing up the link between organic farming and seed commons might lead to the addition of the seed commons criteria.

Kultursaat's farmer-breeders partially open the case of the negative impacts seed commons can have on capabilities. Three of them describe their breeding work as physically demanding and causing back pain. For European standards, their artisanal breeding means harder farming work than in conventional agriculture (as machinery can only be used to a certain limit) or corporate breeding (as laboratory work requires a less stooped posture). While Philippine farming is mostly manual labour as well, MASIPAG's farmer-breeders might not see their seed commons work as impeding on their capability for physical health, as conventional farming is just as intensive in terms of manual labour, as is organic farming. They mention more work in total from farm diversification in another instance, but do not connect it to higher physical demands. Hence, comparison with peers or alternative farming standards seems to have an impact on the positive or negative assessment of this capability by farmer-breeders.

There are some **similarities and differences** between MASIPAG and Kultursaat. In both organisations physical health is connected to seed commons in two ways: first, the physical labour of farming and second, healthy produce. The main difference is that MASIPAG'S members all view their working environment as conducive to their health, while for Kultursaat members opinions are divided as to whether field work is a positive or negative influence on their bodily health. Quality food and less illness is emphasised in MASIPAG, while it plays a minor role for Kultursaat. This might also be due to different accessibility of healthy food in the different cultural-economic contexts. While

Kultursaat's members do not (have to) produce organic food in order to eat it, as they can buy it elsewhere, at least some of MASIPAG's members are limited to on-farm produce for their sustenance.

#### *Capability 7: psychological well-being*

*Capability 7* is striking in its answers, as they are balanced between positive and negative outcomes. Farmer-breeders talk about aspects of seed commons which improve their psychological well-being, but also report negative psychological impacts on their work lives, mainly in the form of stress.

MASIPAG's answers are divided on one point: Does organic farming add to or alleviate stress for small scale farmers? The network's coordinator, as well as farmers report both. On the one hand, financially, conventional farming is more stressful because of the loans farmers take up to finance farming input each season. Organic farming, on the other hand, is more time-intensive, complex and in need of regular observation and adjustment. It might depend on the individual farmer whether this balanced complexity adds to or alleviates farming worries.

Kultursaat's farmer-breeders do not report on existence-threatening financial hardship, but also say that farming with organically bred varieties (and their mostly lower yield) requires a lot of effort, time, and skill to make a worthwhile living in the price pressured agricultural market. What they cherish as positive for their psychological well-being is working in alignment with their values, having created a niche where they have comparably, many more ecological and individual freedoms in their work.

**Similarities and differences** between MASIPAG and Kultursaat regarding mental well-being are diverse. Farmer-breeders of both organisations are proud of their work, which makes them content, and they regard the community within their respective organisations as supportive. Talking about negative effects, farmers of both organisations worry about their farm when attending multi-day meetings.

Differences are that for MASIPAG farmers, economic threat is more present with the lack of a national social security scheme, and they are in danger of facing political repression. They are more likely to reference their situation in contrast to (still) being in the conventional farming system and experience(d) lack of understanding from the local community for adopting organic practices. Kultursaat's breeders, on the other hand, are more concerned with farming and breeding in accordance with their values and reflect more critically on the enjoyable nature of their work content.

The aspects of psychological well-being emphasised in this capability, such as living in accordance with one's values, finding sense and identity in one's work and so on, cannot be found in the most widely used institutional economic commons theories. However, there is the yet to be defined, field of cultural commons theory, which includes cultural shaping by established communities, as well as the development of sense, pride, and purpose. Looking at how ardently farmer-breeders repeatedly touch on these factors, including cultural commons theory into seed commons theory, is warranted.

*Capability 8: giving and receiving support and respect*

Support and respect through seed commons first suggests the group of commoners who maintain them, giving each other support and respect. After all, being connected to a peer group is the most noteworthy difference to private property breeding for this capability. However, MASIPAG and Kultursaat equally regard external actors as a source of respect, and of explicitly receiving the farmer-breeders' support.

MASIPAG's farmer-breeders extend their seed sharing and help to farmers external to the network as well. It can be a neighbour needing a hand on the field or a travelling farmer from another region receiving a spoonfull of seeds. Besides neighbourly help motives, the idea behind it is to support a nationwide transformation to more sustainable food practices, benefitting farmers and the population of the Philippines. The network supports this spread by working with general value statements. Farmers notice that 'seed is sacred' does not only hold true for other commoners but can be extended to other farmers as well.

Other mechanisms of receiving respect are directly built into MASIPAG's institutional structure. MASIPAG encourages building reliable communities, with their policy to not accept individual farmers, but POs, as the smallest membership units. They give training on a PO level and require maintenance of a trial farm by each PO, so farmers necessarily get to know other local farmers, work together, and rely on them to some extent. This practice changes the farmers' outlook from individualist to collective: "You don't just concern yourself but concern yourself to the community." (MAS FB3/FB4: 289). Another structural element fostering support and respect is strict farmer-leadership. The bottom-up democratic structure requires each organisational level to select representatives for the next. Becoming elected by one's group is a sign of respect. The same goes for other institutional instances, where MASIPAG lets farmers speak directly to sponsors, scientists, politicians, and others.

Kultursaats farmer-breeders explain this urge to support outsiders in terms of belonging. They identify as belonging to groups much larger than their organisational peers, such as all organic breeders, all organic farmers, humankind or even all living beings (including plants). A natural part of belonging for them is giving back.

Giving back and receiving respect for it is also expressed in Kultursaats breeders' frustration when a variety they breed is rejected by their sales company Bingenheimer Saatgut AG. It is then not accessible to farmers through a seed catalogue. Farmer-breeders wish for alternative, maybe non-commercial outlets to share these varieties with the world or give them to interested farmers in their region, so they are used and cherished by farmers and consumers. This is due to the alternative, but inherently commercial nature of Kultursaats. The association shows aspects of hybrid governance described in the commoning chapter, as non-capitalocentric values of alternative and open access<sup>183</sup> resource governance mix with commercial interests.

There are **similarities and differences** between MASIPAG and Kultursaats for this capability. Members from both organisations feel that they receive support from their colleagues and respect from both within and outside of their organisation. What starts as support in building an alternative seed system together, frequently extends to general and more personal social support structures for the interviewed farmer-breeders. What is different, is that MASIPAG places greater emphasis on giving support, while Kultursaats members mainly talk about receiving it. In MASIPAG, support and respect are explicitly built into their organisational structure. Both organisations add specific aspects of mental well-being to their answers to this capability. While MASIPAG members add pride, Kultursaats members add belonging. Both pride and belonging are meant to be part of *capability 7: psychological well-being*, which points to a close relationship between the two capabilities.

In terms of commons theory, MASIPAG's example of respect and support developed through its farmer-leadership and farmer-scientist concepts, especially points to a notion of commoning. It is characterised by horizontal relationships in the present, meaning that commoners (ideally) engage on the same level, even if social backgrounds, education, cultures, genders and so on, differ. The case of MASIPAG then shows that this internal commoners' logic has the power to transform group boundaries, as actors external to MASIPAG, such as

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183 While open access is precisely not an attribute of traditional commons, as seen through the Hardin-discussion in chapter 2.2 *An Overview of Commons Theory*, it fits here, as open access refers to the knowledge commons aspects of seed commons, which are non-rival.

scientists and politicians, tend to pay farmers more respect (as farmers describe) after farmers educate themselves in the network and gain confidence.

#### *Capability 9: personal connection to plants*

The connection farmers experience with plants can run deep. Both MASIPAG's and Kultursaats's farmer-breeders describe deep cognitive and spiritual understandings of plants and their relation to humans.

For MASIPAG this is explained with the mandatory organic farming practices and the network's norms and narratives. Farmers are taught to closely observe their plants and the ecological cycles they are influenced by, in official training, as well as personal observation and farming experiments. Through this increased understanding, general environmental concern increases. Farmers understand their collaboration with plants, biodiversity, and ecological cycles not as optional, but necessary for the future of human food.

Some of Kultursaats's farmer-breeders approach plants, not for their function for humans, but as fellow beings, which deserve care and respect. Beyond human reliability on crops and biodiversity, they explore deeper relationships between humans and plants, where the latter are understood as active subjects and teachers for humans.

**Similarities and differences** can be observed between MASIPAG and Kultursaats for this capability. Farmer-breeders of both organisations report gaining a deeper understanding of the interrelation between plants and humans through their work. They also experience closer connection, observation and understanding of plants through organic practices than they did before. Kultursaats's breeders feel that they intensify these practices in going from organic farming to organic breeding. MASIPAG's breeders do not explain if breeding makes a difference for them in this regard, compared to their usual organic farming practices. Further similarities are that interviewees from both organisations have spiritual understandings of, or connections to plants, and single farmer-breeders refer to their lines as being like family members.

There are few differences between the organisations for this capability, save for some Kultursaats members approaching the topic from a different angle. While MASIPAG's members describe connections to plants as a result of their farming practices, some Kultursaats farmer-breeders become breeders because of their already existing connection with plants, or cherish their job especially for the gateway to spirituality their work with plants grants them.

Like the previous capability, personal connection to plants can be located in the commoning strand of commons theory. It explicitly describes commoners' exploration of relationships with non-human actors, such as animals, plants, or the environment at large. The answers of farmer-breeders show how the relationship between plants and humans shifts from a one-sided claim, and the command of humans over plants, to a more balanced, two-sided and mutual relationship.

#### *Capability 10: spirituality and religion*

Most notions towards this capability are straightforward and need little discussion. All in all, the majority of farmer-breeders in both organisations regard (parts of) their work with seed commons as spiritual but negate a religious relevance. One MASIPAG farmer is an exception and connects their seed practices with the Christian proverb 'do unto others what you want others to do to you'. It is not perfectly clear if this relates to producing the healthiest food possible for customers, or if the statement effectively extends the notion of 'others' to plants and nature. If the latter is the case, the spiritual experience with seed commons might, for that farmer, extend the hierarchical Christian belief of humans using plants as they need them, to co-inhabitancy of plants and humans on earth. From a sustainability standpoint this would be promising, as paying respect to fellow living beings is a more compassionate moral motivation for ecologically sustainable practices than keeping plant life intact as one's property.

For Kultursaat, references to plants as fellow living beings are clearer. These breeders see condensed awe for life itself embodied in plants and seeds. They express fascination with seeds' ability to sprout a complete organism and find inspiration in plants' preparedness to exhaust themselves for the next generation of plants, in producing seeds and perishing in the process. This unconditionality to give all of one's strength into one's own life and following lives inspires Kultursaat's members to learn for their own development.

**Similarities and differences** between MASIPAG and Kultursaat for this capability are listed now. Most farmer-breeders from both organisations connect to a spirituality of plants or their work with them. At the same time, with one exception in MASIPAG, none of the interviewees sees religious meaning in seeds. A difference is that for MASIPAG's farmer breeders, spirituality is a general outlook that lets them understand their work also in a spiritual sense. On the other hand, some of Kultursaat's members specifically seek the spiritual content they see in organic breeding for themselves, becoming more spiritual through their work.

All in all, this capability sparks more critical remarks than most others. The main takeaways are that experiencing spirituality is highly individual. Although both organisations incorporate spiritual values into their work and offer customs or exchange platforms for spiritual connection to plants, they emphasise that a spiritual outlook is optional to their work. Most interviewees distance themselves from religious aspects to their work. Based on this high level of agreement, religion is taken out of the capability list, leaving spirituality to remain on its own. In this way it can be combined with *capability 9*, as spirituality regarding plants, learning from plants and connecting with plants are mentioned together.

Regarding commons theory, spirituality can be a part of cultural commons. However, as farmer-breeders are divided in their perception of the relevance of this capability for their work, and the organisations distance themselves from having spiritual motives, this capability cannot be an argument for strengthening cultural commons in the seed commons definition.

#### *Capability 11: beauty in life*

For MASIPAG, capability 11 shows a large overlap with the two preceding capabilities, personal connection to plants (*capability 9*), and spirituality (*capability 10*). It becomes a collective capability for everything farmer-breeders especially value personally, as everything said is mentioned in other previous capabilities. When asked to point out important capabilities, however, beauty in life is a favourite of MASIPAG's farmer-breeders, even before *capability 1: control over one's economic future*<sup>184</sup>. Notably, the network's coordinators and staff on the other hand do not assess this capability as particularly important for their members. This gap might ensue from an emotional reaction to the capability questions, which coordinators cannot assume for the network's members.

Kultursaat's farmer-breeders answer this capability differently. They stay closer to aesthetic beauty in their answers overall, and only sometimes use it to describe aforementioned aspects which make them especially happy.

There are **similarities and differences** between MASIPAG and Kultursaat. Members of both organisations find organic farming and plants and the observation of their life cycles beautiful. They also see beauty in community. For MASIPAG, there are additional mentions of farmer empowerment and gratitude for economic security, while Kultursaat's members emphasise plant aesthetics.

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184 And just behind capability 6: bodily health.

Beauty in life is a category too broad to be located in commons theory. While it is assumed that commoners engage in commons to better their lives (which resonates with MASIPAG's answers to beauty), commons theory specifies aspects which could achieve this goal. As the experience of beauty is highly personal and culturally shaped, however, the capability should remain in the capability list, as farmer-breeders value it. When asked to point out the most important capabilities for them personally, interviewees choose the capability of beauty in life.

### *Two new capabilities*

The discussion of this and the following capability differ from the others. *Capabilities 12* and *13* are not formulated in the capability list for seed commons yet, as they emerge inductively from the empirics of this dissertation. Therefore, in their discussion, I review the literature on seed commons regarding aspects of community (*capability 12*) and values of future sustainability (*capability 13*), compare them to the aspects mentioned in the interviews, and formulate descriptions for both.

### *Capability 12: living in and with concern for community*

In addition to reviews of seed commons literature, the concept of collective capabilities is included here for *capability 12*.

**Literature on seed commons** states that seed commons and organic farming networks either only work in community (Altieri et al., 2012; Manzanilla et al., 2015), or incentivise the emergence of communities (Almekinders & Louwaars, 2002; Altieri et al., 2012; Bocci & Chable, 2009). Seed commons empower their commoners: seed practices improve (Almekinders, 2000), (political) advocacy is facilitated (Coomes et al., 2015; Helicke, 2015) and a collective mobilisation fosters independence from corporations (Helicke, 2015). Knowledge sharing and in-group training are key to achieving this (Almekinders & Louwaars, 2002; Altieri et al., 2012; Bocci & Chable, 2009; Coomes et al., 2015; Helicke, 2015; Montenegro de Wit, 2019). Communities extend beyond the local and incorporate different types of community – they combine local as well as ethnic and value based groups (Almekinders, 2000; Coomes et al., 2015), can have large extension (Coomes et al., 2015), and integrate different actors, such as farmers, scientists and NGOs (Bocci & Chable, 2009). This works because these communities are chiefly guided by shared values (Altieri et al., 2012; Bocci & Chable, 2009; Montenegro de Wit, 2019), such as 'seed belongs to all', and follow logics of reciprocity, sharing and resilience (Coomes et al., 2015; Helicke, 2015). Specific community cultures emerge in these groups



(Altieri et al., 2012) and provide a source of identity for their commoners (Coomes et al., 2015). The latter also stems from the understanding that communities are the stewards of local seeds and those seeds are part of a local heritage (Montenegro de Wit, 2019). Seeds and their communities are intertwined (Bocci & Chable, 2009; Montenegro de Wit, 2019). Seed communities are not entirely unproblematic, though. Social exclusion is frequent and creates access problems for excluded farmers (Coomes et al., 2015).

As a second strand, **literature on collective capabilities** also reflects on the value of community. Ibrahim (2006) describes that collective capabilities emerge from collective action (under certain preconditions<sup>185</sup>). They are capabilities individuals can use for themselves, but can only achieve in groups.<sup>186</sup> In her words, collective capabilities describe “how the expansion and exercise of human capabilities can be a communal rather than only an individual process” (Ibrahim, 2006, p. 398). In *capability 12*, actors touch on this aspect on a meta-level, by pointing out themselves how community is a key factor to achieving (some) of their seed-commons related capabilities. Collective capabilities have a double function for individuals, as they provide opportunities for desirable functioning on the one hand, while also influencing commoners’ value systems as to which capabilities are desirable to achieve in the first place (ibid.). In the case studies, for example, this shows in the way farmer-breeders are inspired by their fellow seed commoners to keep learning (value-reinforcement of *capability 3: sharing of seed knowledge*). Collective capabilities can create virtuous cycles where the development of a collective capability enhances commoners’ agency and in turn creates potential to develop further (collective) capabilities (ibid.).

Ibrahim (2006) explains why collective action is suitable for the creation of collective capabilities. The aspects listed are in line with the positive community aspects of seed commons summed up above.

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185 Ibrahim (2006, p. 407) states that it is more probable for collective capabilities to be created through collective action (which commons are a part of in sociological literature), if the following prerequisites are met: “A communal process of group formation, a dedicated local leader, a supportive ideology, an adequate institutional design and an external actor acting as a catalyst (Olson, 1965, p. 48; Heyer et al., 2002, pp. 6–12; Thorp et al., 2005, p. 911).”

186 In this distinction, there are “individual capabilities, resulting from the individual’s freedom to choose the life he/she has reason to value, and collective capabilities generated through the individual’s engagement in a collective action.” (Ibrahim, 2006, p. 404). Applying this understanding, all the capabilities in this thesis need to be regarded as collective capabilities, as the research question explicitly asks which capabilities members achieve through their participation in their seed commons community. “The main differences between individual and collective capabilities are therefore the process through which these capabilities come about and their potential of benefitting the collectivity at large” (Ibrahim, 2006, p. 404).

“First, collective action is instrumentally valuable for promoting income generation, resource sharing and creating a sense of self-esteem among the poor while encouraging them to participate in local decision-making (Stewart, 2005, p. 190; Thorp et al., 2005, pp. 907–913). Secondly, collective action is also intrinsically important for affecting the formulation of values and beliefs (Alkire, 2002). [...] Thirdly, individual freedoms and collective action are mutually reinforcing. Freedoms widen the possibilities for collective action, while collective action allows individuals to exercise their freedoms (Evans, 2002, pp. 56–57). Finally, the ability to engage in a collective action or form a group is itself a capability (Stewart, 2005, p. 199). [...] And] individuals have multiple affiliations and identities (Sen, 2002, p. 81)” (Ibrahim, 2006, p. 406).

The quote includes the capabilities of economic security (*capability 1*), sharing of resources (*capability 3*), creation of self-esteem (*capability 7*), political participation (*capability 2*), value creation (*capabilities 7 and 13*), as well as positive reinforcement through, and of, groups (*capability 12*) and connects them to the affiliation with a community. It also makes the point that individuals might feel belonging to several different groups.

**The empirics** depicted in the findings touch several points listed above and, in addition, go deeper on a personal level. Farmer-breeders’ descriptions of why they value belonging to a community confirm aspects of the literature. First, that community works on different levels, and they often feel affiliation with their organisation, but also their local communities, all organic practitioners and humankind (upscaling). Through the intensive and conscious engagement in MASIPAG or Kultursaat they gain a general communal outlook, which makes it easier to feel part of other, larger, and less defined groups (like some of those listed above) as well. Second, reciprocity is understood as the core logic of community functioning. This includes free sharing of knowledge and seeds, but also the mention of communities as practical and moral support systems. Some farmer-breeders report that the social structures they build in their communities are a vital part for them to (organically) farm or breed the way they do. Third, just as in the literature, farmer-breeders see shared values as the glue of their community and as its functional core. Organisation is achieved through these shared values and flexibility in different approaches remains coherent, as all actors ultimately align their practices to the values shared. Shared values are one aspect of why farmer-breeders feel that continuity of their farmers’ seeds lies in community, a link that is also explicit in the literature above.

The interviews add farmer-breeders' personal motives as an extension to the findings in literature. Farmer-breeders are motivated by knowing that they contribute to a community. While this motivation might be partly extrinsic, as both MASIPAG and Kultursaat explicitly emphasise community for their members, farmers themselves value community in all the ways listed in the previous paragraph, pointing to intrinsic value for them. For MASIPAG's farmer-breeders explicitly, their scope of thinking is widened, going from a "What do I need?" to a "What does my community need?" and even "What do future generations of farmers need?", "What does humanity need?". Farmer-breeders of both organisations express an understanding that they need social structures to thrive in their farming and are hence, willing to work for the benefit of their communities rather than personal benefit alone. They see intrinsic beauty in community and feel that the thriving of the community is their personal responsibility. Valuing community is thus emotionally grounded for farmer-breeders. They are willing to make personal sacrifices for the benefit of their community, such as the investment of time and resources and even putting the community's best interest before their personal one, if need be.

From all these findings in literature and interview empirics, I describe *capability 12* as follows:

### **Definition of capability 12: living in and with concern for community**

Being able to live in and with concern for community describes both the benefits and responsibilities farmers and breeders reap from their engagement in communities. For landraces, communities are described as crucial to their maintenance (Altieri et al., 2012; Manzanilla et al., 2015). Seed and farming knowledge gets distributed through communities and helps to ensure the quality and enhancement of seed practices (Almekinders & Louwaars, 2002; Altieri et al., 2012; Bocci & Chable, 2009; Coomes et al., 2015; Helicke, 2015; Montenegro de Wit, 2019). Seed commons are organised through shared values (Altieri et al., 2012; Bocci & Chable, 2009; Montenegro de Wit, 2019) and are therefore able to extend to various levels, meaning that farmers and breeders can perceive affiliations with more than one community (Almekinders, 2000; Bocci & Chable, 2009; Coomes et al., 2015; Sen, 2002).

The affiliation with a community is also intrinsically valuable to farmers and breeders (interviews). They are motivated by a perceived responsibility to contribute to a thriving community, and find it enriching to share values with a likeminded group (Alkire, 2002; interviews; Ibrahim, 2006). Communities provide identity, a shared culture and preserve local heritage (Altieri et al., 2012; Coomes et al., 2015; Montenegro de Wit, 2019). Ideally, they provide

farmers and breeders with opportunities for more personal freedom and to develop further group capabilities (Ibrahim, 2006).

*Capability 13: working for a human(e) future*

Farmer-breeders inspire another capability in repeatedly referring to the goal of a sustainable future for farming, which motivates them in their work. In the **literature on seed commons**, this notion is also reflected, even if less as a source for motivation and inspiration and more as a practicality.

To maintain food security in the future, agrobiodiversity is key (Helicke, 2015). Agrobiodiversity, again, is shown to be best maintained by farmer communities and local seed systems (Almekinders & Louwaars, 2002; Bocci & Chable, 2009; Pautasso et al., 2013). Hence, farmer communities have the ability to support future food sovereignty and agricultural resilience (Altieri et al., 2012; Vernooy et al., 2017), and modern seed exchange networks have the explicit aim of agrobiodiversity conservation and farmer mobilisation (Bocci & Chable, 2009; Coomes et al., 2015; Pautasso et al., 2013). This farmer community predisposition to preservation is due to the relationships seeds have to their environment. Seed preservation should be done in situ (Helicke, 2015; Pautasso et al., 2013), as preserving seed systems is only possible, if the ecology, culture, knowledge and values around them are preserved as well (Altieri et al., 2012; Vernooy et al., 2017). Landraces especially, are embedded in a bioculture that comes with local values, which they cannot sustainably be isolated from (Montenegro de Wit, 2019; Vernooy et al., 2017). Preserving agrobiodiversity is hence both a matter of practicality and values (Coomes et al., 2015).

The values held by farmer communities to maintain local seed systems and agrobiodiversity reach in two directions: past and future. One value and motive is the preservation of heritage created by farmers in the past (Altieri et al., 2012; Helicke, 2015; Montenegro de Wit, 2019; Pautasso et al., 2013). Another, ensuring agrobiodiversity for future generations (Bocci & Chable, 2009; Helicke, 2015). Values are central to seed communities, as they facilitate social organisation (Altieri et al., 2012). Farmers enter into a value dialogue about plant preservation in seed communities (Bocci & Chable, 2009) in which they create collective norms to tackle (future) enclosures (Helicke, 2015). In that way, commons become role models for future visions in wider society (Montenegro de Wit, 2019). Values are not necessarily fully agreed upon in those communities, but common ground is found amongst them (Helicke, 2015).

Much of what is found in **literature is replicated in the empirics**. Farmer-breeders follow the past-and-future values of seed preservation, both because they inherit seeds from former generations, as well as to preserve them for future generations. Their vision of how seed preservation should be managed is more detailed, however. First, they emphasise regionality and sovereignty, frequently mentioning increasing corporate enclosure of seeds in the same argument. In contrast to literature, farmer-breeders draw direct links to organic agriculture as a prerequisite to maintain seed sovereignty and preserve the environments around them. Another topic melds into their value systems – climate change resilience – which farmer-breeders hope to achieve through locally adapted varieties. This is also a point literature does not explicitly connect. Also, farmer-breeders go further than their farming communities when talking about the value of seeds. They stress that seeds are not only necessary for farmers' jobs, but essential to feed all of society. A last point which confirms the view expressed in the literature, is that farmer-breeders rely on values and value-based teaching to enhance seed sovereignty, rather than applying fixed rules.

### **Definition of capability 13: working for a human(e) future**

Working for a human(e) future, meaning a future in which coming generations can live similarly well (fed) to how we do now, translates to sustainable seed practices and the preservation of biodiversity. In literature, it is primarily depicted as a practicality: Agrobiodiversity is vital to future food security (Helicke, 2015) and is best achieved by farmer communities (Altieri et al., 2012; Vernooy et al., 2017), as they preserve and share, not only the seeds themselves, but also knowledge, ecology, culture and values connected to them (Altieri et al., 2012; Vernooy et al., 2017). Authors emphasise the necessity of (group) values for the preservation of agrobiodiversity (Coomes et al., 2015). They can either be directed towards the future (Bocci & Chable, 2009; Helicke, 2015) or based on a responsibility inherited from past generations of seed stewards (Altieri et al., 2012; Helicke, 2015; Montenegro de Wit, 2019; Pautasso et al., 2013).

These values facilitate flexible social organisation (Altieri et al., 2012) through collective norms (Helicke, 2015), which is a guideline and source of motivation for farmers (interviewees). Seed sharing has become a purpose for them, extending beyond their community (ibid.). Farmer-breeders have detailed understanding of preservation methods embedded in and adjusted to their socio-ecological surrounding (ibid.) and maintain current agrobiodiversity also for their adaptation to climate change (ibid.).

## Summary of discussed capabilities

Farmer-breeders cherish their involvement in seed commons, an undercurrent they express in *capability 11: experiencing beauty in life*. They feel better off and happier through their work with seed commons, each individually for differing reasons, but united in their overall perception.<sup>187</sup> From a viewpoint of property theory it is striking that interviewees touch on manifold aspects of what they gain through seed commons, going beyond economic security (the basic notion of property). They also cherish aspects of living in community, adhering to values and sharing their knowledge, to name but a few.

Members of both organisations describe developing as humans, most mentioning learning to think critically through discussions with their peers, and some emphasizing becoming more vocal in their communities and towards authorities, such as politicians or scientists. They take pride in their work, being able to help others with information and seeds, realising the respect of others and being able to build relationships as equals with a wider range of people.

MASIPAG's farmer-breeders describe seed commons as helping them overcome practical challenges, such as financial and food insecurity. Kultursaat's members especially cherish being able to live their life according to their personal values of sustainability and heritage preservation.

Farmer-breeders understand themselves in relation to others on various levels: in their seed commons communities, in other groups which support their interests (e.g., all organic farmers), in society, but also in humanity and in their responsibility towards future generations. They furthermore form relationships with their plants, their culture, and their environments.

From this integrated picture of seed commons capabilities, it is not surprising that the thirteen capabilities described are substantially interconnected (Figure 15).

Most capabilities connect to at least five other capabilities, with *capability 6: bodily health*, *capability 2: participation in political decisions* and *capability 13: working for a human(e) future* being the exceptions to that rule. *Capability 1: control over one's economic future*, *capability 3: sharing of seed knowledge* and *capability 8: giving and receiving support and respect* are heavily interconnected and should be viewed as particularly central to seed commoners and the concept of seed commons.

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187 Of course, this analysis is skewed, as only active seed commoners are interviewed.

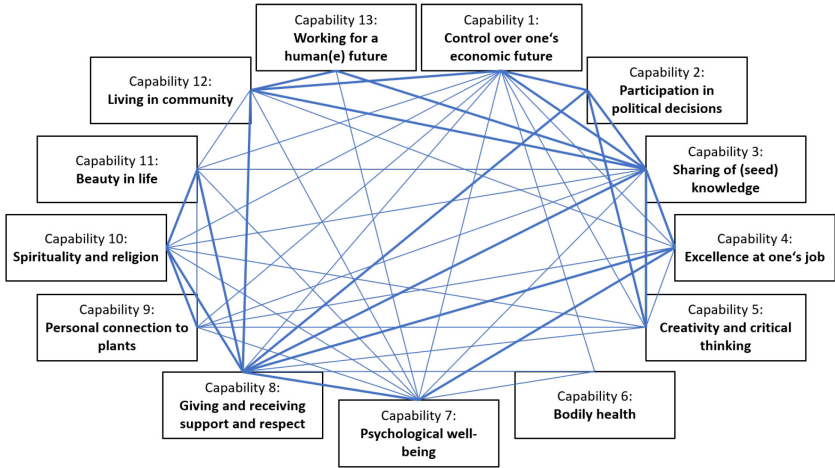


Figure 15: Interrelations between the 13 capabilities for seed commons as mentioned in the interviews. Stronger lines point to frequently mentioned connections, lighter lines to less frequent ones. Source: Own depiction

## 6.2 Discussion of the Theory Strand of Seed Commons

The second part of this discussion offers a conceptual perspective on the relationship between capabilities and seed commons. On the one hand the connection of the two main theory strands in this thesis, the capability approach, and seed commons, makes clear the reasons the capabilities identified in this work are so extensive and straightforward. On the other hand, it brings insights into the application of commons theory to understanding specific cases, and helps to form a wholistic picture of the experience of individuals in engaging in commons. Finally, it compares conceptual differences between seed commons and private property arrangements based on capabilities.

So, how do individuals' capabilities relate to seed commons? Are the characteristics of seed commons as property regimes especially conducive to well-being? To answer these questions, the conceptualisation of seed commons in chapter 3.1 *Seed Commons* is once more brought to mind. For the purpose of comparison, Figure 16 below summarizes which characteristics seed commons inherit from which concept of institutional-economic and sociological-anthropological commons research.

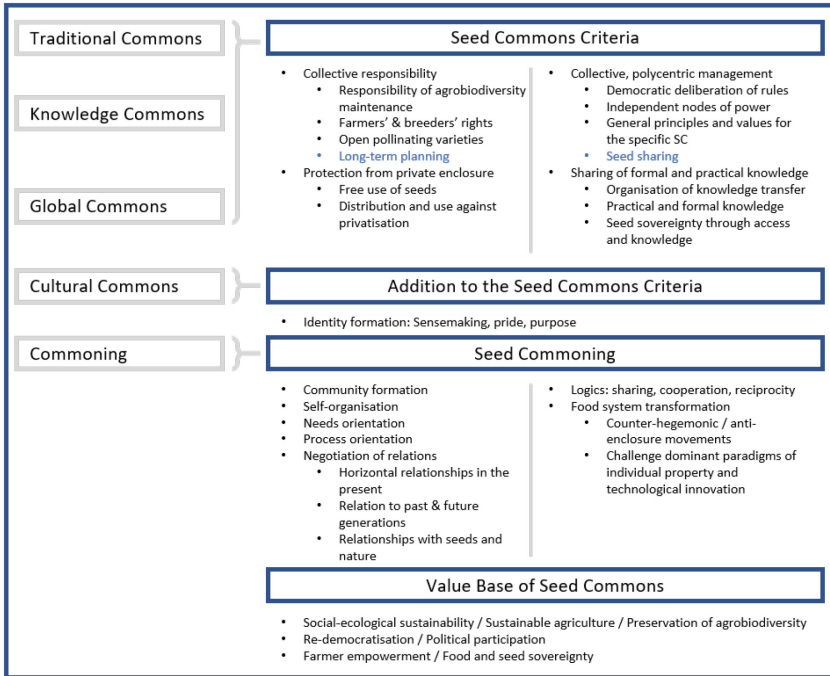


Figure 16: Characteristics of seed commons inherited from various basic types of commons concepts. Source: Own conceptualisation

For the first three commons concepts (traditional, knowledge and global commons), most points are part of the seed commons criteria by Sievers-Glotzbach et al. (2020). Two bullet points indicated in blue are added from knowledge commons and global commons theory: long-term planning and seed sharing. Cultural commons add aspects of identity formation through collectively emerging culture within seed commons. The largest set of characteristics is informed by the commoning concept. This is consistent as commoning provides a radically different outlook on commons compared to more traditional theories. It adds processual, relational, value-based, and critical characteristics. Finally, central values of commons are included in their specific formulation relevant to seeds. As such, for example, the basic commons value of sovereignty is specified as farmer empowerment and seed sovereignty in the seed commons context.

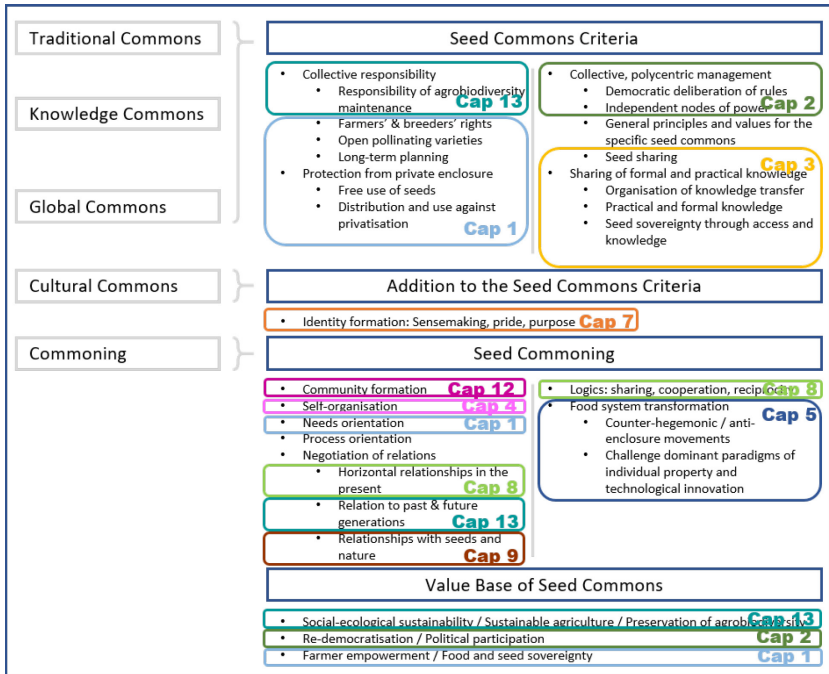
For an **interpretation of the findings**, the capability list of seed commons, as applied in the interviews with its updated thirteen capabilities, is now assessed



against the seed commons characteristics of Figure 16 to understand if individuals' capabilities regarding seeds relate to seed commons on a conceptually consistent level and how so. For this, the descriptions of the capabilities from the findings (chapter 5) are compared with seed commons characteristics (Figure 17).

Except for three capabilities (capabilities 6, 10 & 11), all capabilities from the list can be found explicitly or in close approximation in the seed commons characteristics. I have indicated only one capability expression per bullet point, although sometimes several could apply. For example, the point *food system transformation* in the commoning section, is indicated as an expression of *capability 4: creativity and critical thinking*, while it also fits with *capability 2: participation in political decisions*. The primary aim of Figure 17 is to show that capabilities are indeed translated substantially in the seed commons concept. Exactly how and where, is of lesser concern at this stage, as my research is based on two cases, and focus in seed commons configurations might vary between different organisations.

Going through the seed commons characteristics in Figure 17 from top to bottom reveals emphasis and recurrent themes of different commons theory elements regarding capabilities. Topmost, the seed commons criteria entail aspects of traditional, knowledge and global commons. Capabilities on economic security (*capability 1*), political participation (*capability 2*), knowledge sharing (*capability 3*) and future sustainability (*capability 13*), find expression here. They capture the classical themes of these commons: traditional commons are concerned with the long-term economic sustainability of communities facing scarce natural resources, an expression of *capabilities 1: control over one's economic future* and *capability 13: working for a human(e) future*.



- Capability 1: control over one's economic future
- Capability 2: participation in political decisions
- Capability 3: sharing of (seed) knowledge
- Capability 4: excellence at one's job
- Capability 5: creativity and critical thinking
- ~~Capability 6: bodily health~~
- Capability 7: psychological well-being
- Capability 8: giving and receiving support and respect
- Capability 9: personal connection to plants
- ~~Capability 10: spirituality and religion~~
- ~~Capability 11: beauty in life~~
- Capability 12: living in and with concern for community
- Capability 13: working for a human(e) future

Figure 17: Capabilities identified within characteristics of seed commons. Source: Own depiction

Knowledge commons conceptualise the development and dispersion of knowledge in resonance with *capability 3: sharing of (seed) knowledge*. Global commons are concerned with organisational, procedural and deliberational aspects of preserving natural resources vital to humanity, which is found in *capability 2: participation in political decisions*, and *capability 13: working for a human(e) future*. The only bullet point which remains without capability equivalent is having *general principles and values for the specific seed commons*, which describes the concise value statements seed commons initiatives use to delineate their practices and organisational structure. For MASIPAG it is *seed is sacred*, for Kultursaat *seeds are cultural goods*<sup>188</sup>. It does not find an expression in capabilities on this level of general formulation, because it is a technical characteristic with the goal of structural and functional organisation. Looking at the specific value statements, however, shows a connection of MASIPAG's *seed is sacred* to *capability 10: spirituality and religion* and a closeness of Kultursaat's *seeds are cultural goods* to *capability 3: sharing of (seed) knowledge* and *capability 13: working for a human(e) future*.

Cultural commons add identity formation, including pride, purpose and sense-making, to seed commons characteristics. These aspects are written into the description of *capability 7: psychological well-being* as well. While cultural commons do not ensure the psychological well-being of seed commoners, they offer a possibility to meet parts of it.

Seed commoning captures a range of capabilities, including those distinct to the seed commons criteria above. The capabilities connected to commoning are concerned with community aspects and the application of one's abilities: *capability 4: excellence at one's job*, *capability 5: creativity and critical thinking*, *capability 8: giving and receiving support and respect*, *capability 9: personal connection to plants*, *capability 12: living in and with concern for community*, and *capability 13: working for a human(e) future*. That these capabilities are concerned overall with relational, personal and transformational aspects of well-being is likely due to the sociological nature of the commoning concept (while the seed commons criteria are derived from institutional-economic commons theories). Connections between the bullet points and assigned capabilities are mostly straightforward and do not require deeper discussion. For example, the alignment of the seed commons characteristic of *community formation* with *capability 12: living in and with concern for community* is evident.

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188 German original: Saatgut ist Kulturgut.

An exception is the bullet point *self-organisation*. It can be connected to various capabilities, for example participation in political decisions (*capability 2*), as organising in a group requires negotiation, voting, and being independently organised, which can be seen as a form of political statement. It is, however, not classically considered as politics in the narrow sense. *Self-organisation* also holds aspects of control over one's economic future (*capability 1*), because the independent organisation of seeds ensures independence from corporations. *Capability 4: excellence at one's job*, would also fit, as *self-organisation* is a task additional to farming and requires more skill, and hence excellence in one's work. Likewise, in *capability 8: giving and receiving support and respect*, interviewees frequently mention enjoying the esteem and trust of others in their functions within their POs (MASIPAG). Which capability expresses itself in *self-organisation* might therefore be an individual question for each farmer-breeder. While one might feel economically empowered (*capability 1*), another might cherish the political influence (*capability 2*) and respect from others (*capability 8*) they gain while self-organising in a group.

Another characteristic which can be assigned to various capabilities is *horizontal relationships in the present*, which is ascribed to *capability 8: giving and receiving support and respect* but is just as correctly related to *capability 12: living in and with concern for community*.

Two capabilities are repeated in seed commoning, which are already part of the institutional-economic seed commons criteria: *capability 1: control over one's economic future* and *capability 13: working for a human(e) future*. This makes apparent the fact that the institutional-economic commons theories and theories of commoning are generally applied independent of each other. While their focus varies, central claims and values overlap.

The remaining bullet point in the commoning section, *process orientation* is not coded with a particular capability. Rather, it is a common denominator of the main topics commoning adds to seed commons: relations, personal excellence and transition. All of them apply a processual outlook and can only be sensibly described when understood as processes.

The final element to the seed commons concept, the value base of seed commons (*seed sovereignty, re-democratisation and social-ecological sustainability*) repeats *capability 1: control over one's economic future*, *capability 2: political participation* and *capability 13: working for a human(e) future*: economic control, political participation, and future sustainability. They are at the

heart of seed commons and reflect their primary purpose, as well as their basis for long-term reproduction.

Four capabilities are not identified amongst the seed commons characteristics: excellence in one's job (*capability 4*), bodily health (*capability 6*), spirituality and religion (*capability 10*), and beauty in life (*capability 11*). Being excellent in one's job, experiencing spiritual and religious connections and finding beauty in life are personally determined experiences. They mean different things to different people and can thus hardly be found in a general concept. Also, the seed commons concept is drawn up for the function of the commons institution, not the well-being of its commoners. Often, as we have seen, those two aims overlap. For the three capabilities mentioned, however, the commons institution does not necessarily benefit from their fulfilment for its commoners. The capability of bodily health is fulfilled by the application of organic farming practices within the seed commons (or impeded by the hardships of farm work). Organic farming is not part of the seed commons concept, however, as seed commons could be possible in a conventional system as well. In practice, organic farming practices are in tune with seed commons values and both instrumental and consequential to seed commons. Hence, the capability of bodily health vanishes from the graph, as organic farming is not included as an explicit characteristic.

The interplay between capabilities and seed commons characteristics has **implications** for both well-being regarding seeds and seed commons conceptions.

For well-being concepts, we see that most well-being aspects are directly fostered through the design, values, and practices of seed commons. A few capabilities are too dependent on personal preferences to be reflected in the seed commons characteristics, such as the three mentioned previously. This implies a strong connection between the design of commons institutions in general and their conduciveness to well-being, also discussed below in a reflection on well-being in private property regimes. Central well-being aspects are especially repeated in institutions, both in their structures (institutional-economic theory), practices (commoning) and value base. This means that proclamations of aspects central to an institution are indeed which aspects of well-being it promotes and which it foregoes. Is sustainability emphasised or utility? Community or individual opportunity?

For commons concepts it becomes clear that organisationally, they are quite concisely explained by an interplay of various institutional-economic commons theories. However, commoning adds a relational and processual layer of thought and helps to analytically understand the interweaving of the commons'

material base (seeds and their characteristics) with its social interplay (group and personal aspects). To an understanding of well-being in seed commons, commoning adds about as many capabilities<sup>189</sup> as institutional-economic commons theory aspects do<sup>190</sup>. More than for organisation, commoning should be added to depict sociality, practices, and motivation of commoners. Commoning thus adds valuably to a well-being understanding of seed commons and an understanding of commons' potential in general, as various capabilities farmer-breeders relate to would be overlooked in purely institutional-economic concepts. Finally, it is the mix of different commons aspects that makes seed commons particularly conducive to well-being. Every commons theory strand adds its own emphasis, and hence capabilities, to the concept of seed-commons. In conceptualising commons for new areas of application, researchers should thus include as many commons-types as possible into their considerations: does the commons entail knowledge aspects (knowledge commons)? Does it have cultural elements (cultural commons)? And, of course, how are relations built through commoning practices (commoning)?

Finally, a question to answer is how the structure of seed commons promotes or inhibits well-being. Structure, in this case, entails the organisation, practices and values of seed commons, which is what is depicted in Figure 17 above. First, due to the complexity of seeds and their genetics (variety), maintaining them successfully requires an approach which integrates both material and social elements. MASIPAG and Kultursaat describe their efforts roughly as long-term economic sovereignty through seed and knowledge sharing in community, to quote: "The sharing of seed is done accompanied with a little orientation, [on] the importance of seeds. So that when we share our seeds, we're hoping that the farmer that we share with will value the seeds and they're going to maintain it." (MAS FB3/FB4: 42). It mixes material flows (seed and knowledge) with practices (sharing), values (long-term sovereignty) and social requirements (in community), to achieve economic viability. These elements support each other, as becomes clear from the findings (chapter 5). For example, long-term seed use is only possible with locally adapted open-pollinating varieties (meaning biologically and legally reproducible varieties), which are especially suitable for organic farming settings and are best kept in-situ to be

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189 Commoning capabilities in seed commons: capability 5: creativity and critical thinking; capability 8: giving and receiving support and respect; capability 9: personal connection to plants; capability 12: living in and with concern for community.

190 Institutional-economic capabilities in seed commons: capability 1: control over one's economic future; capability 2: participation in political decisions; capability 3: sharing of (seed) knowledge; capability 7: psychological well-being; capability 13: working for a human(e) future.

able to develop under local conditions. Hence, sharing is established to spread seeds, and knowledge exchange to keep track of how they fare. This requires an organised community. Again, all elements from the above statement are found, as this structure seems inevitable, or at least conducive to the maintenance of seed commons. In this structure, *capabilities 1, 2, 3, 5, 8, 12 and 13*<sup>191</sup> are already inherent, covering a broad spectrum of well-being qualities. Second, simple values are used to structure seed commons in the way just described, efficiently preserving compliance in large groups and providing guidelines for all organisational aspects. For MASIPAG this is, *seed is sacred* and for Kultursaat e. V., *seeds are cultural goods*. These values and the full range of their application are continuously thematised, which makes members understand if and how novel practices comply to the value base. For the structure to work through fixed rules, every technical and praxis innovation by seed commoners would need to be discussed with the community. The orientation on one central value statement makes flexible and polycentric structures possible. For capabilities the adherence to one central value statement gives rise to capabilities regarding self-efficacy, such as excellence at one's job (*capability 4*), creativity and critical thinking (*capability 5*) and psychological well-being (*capability 7*), which includes sensemaking, pride and identity. The ubiquitous quality of the value base in the seed commons structure also explains why *capability 13: working for a human(e) future*, which is grounded in sustainability values is repeated throughout the commons concept and is found both in the institutional-economic commons conception, as well as in commoning. So, in short: the structure of seed commons in general promotes well-being measured in capabilities.

On the other hand, certain qualities of seed commons inhibit well-being. The complex seed common's structure, its deliberative organisation and the constant need for knowledge exchange and actualisation is time intensive. Also, the farmer-breeders report they are driven by a moral obligation to fulfil the value statement of their organisation. All in all, this makes seed commoners prone to overworking and makes finding a work-life balance difficult.

What, now, do these insights imply for private property regimes as the currently prevalent alternative of seed organisation? A chapter in *Appendix B: Property Regimes – Background Theory* gives background information on property regimes in general and private property regimes as well. In short,

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191 Capability 1: control over one's economic future; capability 2: participation in political decisions; capability 3: sharing of (seed) knowledge; capability 5: creativity and critical thinking; capability 8: giving and receiving support and respect; capability 12: living in and with concern for community; capability 13: working for a human(e) future.

private property regimes attempt a one-size-fits-all solution for any form of goods or service, to the exclusion of others. It describes private claims towards a resource, which are backed and enforced by states as sovereigns. These claims (as well as duties and exceptions) are written down in law. Social welfare, achieved through individual security and individual freedom (Gmeiner et al., 2020) is a value central to private property regimes.

Private property overlooks inherent sustainability values.<sup>192</sup> Due to its fixed, written nature with a sovereign power to decide on matters of justice, private property has virtually no relational and processual dimensions (unless something goes wrong and you sue your neighbour over an ever-intrusive hedge). There is little need for group negotiation in everyday life with private property and the regenerative and acknowledgement processes which go with it. There is little need for relational exchange and deliberation, as private property entails clear and non-negotiable rights over things and towards people. All in all, commoning aspects found in common property regimes are diminished or lacking in private property regimes. This also means that capabilities realised through commoning are not systematically fostered in private property, such as the value-based capabilities of sustainability and community capabilities. From this comparison, it is probable that most capabilities are not automatically fostered in private property regimes, as they would be in commons. It is not possible to determine, if private property regimes could inhibit the realisation of capabilities in other areas of life (similarly to seed commons making work-life-balance more difficult).

### **6.3 Refining the Capability List for Seed Commons**

The findings in chapter 5 *Findings*, as well as the discussion in this chapter show, that most, but not all capabilities are relevant to farmer-breeders. At the same time, farmer-breeders mention capabilities, which are not included in the original list.

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192 Private property regimes developed around the 17<sup>th</sup> century for goods, which were not scarce at the time, such as land, wood and game (see Locke, 1690). In his opinion, private property liberates men from serfdom and ensures their claims on resources they refine through their labour. A chair crafted from an oak is rightfully the crafter's then, as is a field ploughed, sowed, and harvested. Commons on the other hand developed even earlier, but frequently in instances where resources were economically necessary for survival, yet scarce. Examples are mountain meadows, which can feed a village, but only if efficiently managed. Sustainability is thus necessary as a value from the start, while it is superfluous in the beginning of private property.



The changes made to the list of capabilities for seed commons entail the cutting out of *capability 4*. Some less recognised capabilities are integrated with others. At the same time, two more capabilities are added to the list: *capability 12: living in and with concern for community*, and *capability 13: working for a human(e) future*. They are the outcome of the repeated emphasis on community and sustainability aspects of well-being by farmer-breeders. As these aspects are not adequately and explicitly described in any of the original eleven capabilities, two more are introduced in the previous chapter (*capabilities 12 and 13*), based on findings. Their theoretical base is added in this chapter below.

CAPABILITY 1:	CONTROL OVER ONE’S ECONOMIC FUTURE
CAPABILITY 2:	PARTICIPATION IN POLITICAL DECISIONS
CAPABILITY 3:	SHARING OF (SEED) KNOWLEDGE
CAPABILITY 4:	CREATIVITY AND CRITICAL THINKING
CAPABILITY 5:	BODILY HEALTH
CAPABILITY 6:	PSYCHOLOGICAL WELL-BEING
CAPABILITY 7:	GIVING AND RECEIVING SUPPORT AND RESPECT
CAPABILITY 8:	PERSONAL CONNECTION TO PLANTS & SPIRITUALITY
CAPABILITY 9:	BEAUTY IN LIFE
CAPABILITY 10:	LIVING IN AND WITH CONCERN FOR COMMUNITY
CAPABILITY 11:	WORKING FOR A HUMAN(E) FUTURE

Figure 18: Revised capability list for seed commons. Source: Own depiction

*Capability 4: excellence at one’s job*, is dropped from the list. This is decided for two reasons: First, farmer-breeders are divided on the necessity of the capability, with several of them denying it any significance in their perception. Second, answers in this capability are all also taken up in other capabilities, making *capability 4* redundant. Prominently, excellence is connected to receiving respect (*capability 8*), psychological well-being (*capability 7*) and self-expression, which is repeatedly mentioned by farmer-breeders in *capability 11: beauty in life*, as well. As a final alteration, religion is excluded from *capability 10: spirituality and religion*, as farmer-breeders can generally relate to connecting spiritually with their work, but not religion. In a next step, spirituality is included into *capability 9: personal connection with plants*, as farmer-breeders’ descriptions of their spirituality regarding seed commons parallels their understanding of personal connection with plants for the most part.

As a result, the final capability list for seed commons, with blue marks indicating the described alterations, appears above in Figure 18.

## 6.4 Methodological Discussion

This discussion and its implications need to acknowledge some limitations. First, it is based on only two case studies. As an empirical base, this is not sufficient to draw conclusions for a population, or in this case generalize findings for all seed commons or other property regimes. The ideas on possible well-being implications of private property regimes especially, must be read as reasoned speculations based on empirical hints. While two case studies are not many, the conceptualisation of seed commons this work is based on has gathered a wide array of seed commons examples from literature to draw up the seed commons concept (Sievers-Glotzbach et al., 2020). The discussion keeps this foundation in mind, still, ideas on the interplay of well-being and seed commons are formulated as suggestions and points for further research rather than facts.

Interview settings are distinct in Germany and the Philippines. For one, interviews with Kultursaat only include farmer-breeders, while coordinators are interviewed additionally in MASIPAG. Likewise, with Kultursaat members, interviews are conducted one on one, while MASIPAG farmers are interviewed in pairs, mostly with the addition of a staff member as translator.

These choices are made to minimise the language barrier with Filipino participants. The main mother tongues of farmer-breeders are Tagalog and Visayan among other dialects. While some understand English sufficiently, expressing themselves on the personal level required for the capability interviews is difficult. Coordinator interviews are included, as they are educated to university level and hold intercultural expertise from travels. It is second nature to them to translate Filipino cultural concepts in ways that can be understood by European scientists. Staff are chosen to translate, so the translator is familiar to the interviewees, creating a low-threshold setting. The same goes for the decision on the two-person interview setting. Farmer-breeders are expected to have increased confidence in pairs and be more open to personal questions.

For Kultursaat's members, the setting is different. The initial approach to the farmer-breeders is slowly built over a one-and-a-half-year period where our research group visits their events and gets to know them in low-key personal conversations. Interviews are only conducted afterwards; hence one-on-one interviews are estimated to be unproblematic. Interviews are conducted in German, mother language to both researcher and interviewee.

The differences in interview settings are conscious choices reflected by the researcher to receive the most honest and open answers possible. Still, comparability of both settings (and hence case studies) suffers from this approach.

Another option would have been to partner with Filipino researchers and ask them to conduct one-on-one interviews with MASIPAG's farmer-breeders in Tagalog. In that case, however, translation is still an issue reducing comparability.

To ensure tool validity, interview guidelines should have been pre-tested to see if they were understood the same way in both cultures. The interview guideline for MASIPAG is translated to English and are phrased simply, especially as MASIPAG's farmer-breeders have the disadvantage of meeting the researcher for the first time and only have basic information about the research project. For Kultursaat's farmer-breeders it is different, as they have known the project and researchers for more than a year when interviewed. An example of a question in the interview guideline which is phrased differently for Kultursaat and MASIPAG is the one for *capability 5: creativity and critical thinking*. While the German interview guideline phrases it as 'In what way does this work influence your creativity and critical thinking?' [own translation], the English one (for MASIPAG) is more specific in its focus on the research subject, asking 'Which new ideas did you have about farming and breeding since working with MASIPAG? Do you enjoy breeding yourself?'.<sup>193</sup> Nevertheless, results for this question are quite consistent for both contexts. On the other hand, the question for *capability 7: psychological well-being*, is phrased rather consistently for Kultursaat ('How does this work influence your worries and your stress (psychological health)?' [own translation]) and MASIPAG ('How does working with MASIPAG influence your stress and worries, relaxation?'). The responses are strikingly distinct for both organisations, with Kultursaat's breeders emphasizing the health-conducive aspects of their trade and MASIPAG's farmer-breeders relating more to the encumbering parts. This can either mean that the question is understood differently in both (cultural) contexts or that farmer-breeders genuinely differ in perceptions on the matter in the two countries. A pre-test would have cleared that up.

A word of caution as well to the ideas reported for further commons conceptions. Insights might be specific to seed commons and although they are based on the seed commons concept and should hence compare well to concepts of other commons applications, findings might vary.

I recommend doing further research on other seed commons to back up findings for smaller seed commons in scarcity, as well as the larger seed commons of affluent actors. Seed commons governed by non-commercial actors can be

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193 The second question is added to find out if the MASIPAG farmer in question breeds as well, as most of the network's farmers do not engage in breeding.

included as well as indigenous seed commons, and, if found, seed commons in conventional agricultural regimes. Further research is then warranted for other, similarly complex commons regarding their well-being contribution. Possible options are global digital commons, marine commons, and health commons. A question remains whether individual well-being is relevant in global commons where few individual actors participate, or only states and organisations. Another is whether all commons are internally structured by a concise value statement. Findings can then be compared, and better conclusions drawn for actors' well-being in commons in general. Finally, a comparative study should be conducted for resources in both commons and private property regimes to generate more insights on their differences in the realisation of capabilities, and critically discuss the ideas drawn up here.

Recommendations regarding commons research are to include as many commons concepts as possible into one's analysis. Each of them offers a different angle of understanding. Interdisciplinarity is hard to avoid if the social implications of, and the motivations for commons are to be adequately depicted. Commoning otherwise remains overlooked, as do identity forming aspects of cultural commons.

Practical recommendations of this research for the conception of seed commons, are to understand actors' complex well-being needs as intricately as possible, before designing a seed common. Wider aspects than purely economic ones should be considered, the revised list of eleven capabilities for seed commons can serve as a tool to uncover the needs, hopes, motivations and aspirations of farmer-breeders.

The concluding chapter sums up the work and gives a more coherent outlook for practical implications and further research opportunities.



## 7 Conclusion and Outlook

### 7.1 Central Results

Seed commons influence the lives of farmer-breeders who create and maintain them. To dive deeper into the topic, the research question of this thesis asks: *In what way do seed commons influence farmer-breeders' individual well-being, visible in the capabilities they enable or inhibit?* Both conceptual and empirical answers are given in previous pages. They are summed up here once more, to provide both an overview and a coherent picture of the link between seed commons and the individual well-being of farmer-breeders.

#### Recap – Why this thesis?

Important factors for individual well-being are social ties, as psychological research shows. Property regimes, in turn, are social constructs. They determine who holds which rights against others, regarding specific resources or services. As property arrangements are social and ubiquitous in modern societies, it is no surprise that their design matters for the well-being of people (see chapter 2.1 *On Well-Being*). Well-being is measured in the capability approach as the vastness of choices individuals have to shape their lives in valuable and meaningful ways (same chapter). It is chosen here to understand in which ways property regimes enable or inhibit actors. Most research takes (private) property institutions as given and looks at how actors can use them best for their well-being. This research rethinks property institutions so they might be more likely to foster well-being. Empirically this is done through a viable alternative property regime, mostly neglected in well-being research until now: commons (chapter 2.2 *An Overview of Commons Theory*).

Common property institutions are used worldwide to steward agrobiodiversity in the form of seed commons. The social well-being function of seeds and agrobiodiversity for human (future) consumption is widely acknowledged (chapter 2.3 *Of Seeds and Humans*). At the same time, little insight exists into individual well-being and seeds.

## Conceptual findings

The conceptualisation of seed commons (chapter 3.1 *Seed Commons*) used in this thesis is mostly based on the ideas of Sievers-Glotzbach et al. (2020). However, it is further developed in several points.

1. The concept of commoning, with its processual and relational outlook, is given more importance in relation to aspects of traditional, knowledge and global commons. This is done because many components of individual well-being are assumed to be located in practices (processes) and connection (relations) and should hence be especially visible through the lens of seed commoning. The alignment of seed commons capabilities and the seed commons concept in chapter 3.2 *The Capability Approach for Seed Commons* further backs this decision up, as the bulk of capabilities is located in characteristics of seed commoning, in comparison to fewer capabilities spread over conceptual aspects of traditional, knowledge, global and cultural commons.
2. Especially noteworthy are the three kinds of relations which are negotiated within seed commons: Relations between commoners as peers; relations to others, including past and following generations; and relations to seeds and agrobiodiversity (chapter 3.1 *Seed Commons*). They explain parts of the value-base of seed commons (heritage and future sustainability), feelings of community and acknowledgement through horizontal relations between actors (little hierarchy) and beyond the group, making room for a new onto-epistemology of seeds which is visible in farmer-breeders' recognition of plants as living subjects in various ways.
3. Cultural commons are added to the seed commons concept in this thesis. Including a cultural commons outlook that helps to better recognize identity, sensemaking and purpose motivations of seed commoners. These motives are found in most concepts of well-being (conceptual; chapter 3.2 *The Capability Approach for Seed Commons*), as well as descriptions of their work with seed commons by farmer-breeders (empirical; chapter 5 *Findings*).<sup>194</sup>
4. All in all, this thesis further describes how intricately social commons arrangements are linked to the material prerequisites of the seeds they govern (chapters 3.1 *Seed Commons* and 6 *Discussion of the Findings*). The capabilities for seed commons show, in their overlap to the seed commons

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194 A somewhat recursive research cycle is visible here.

conception (chapter 6.1 *Discussion of the Theory Strand of Seed Commons*), that the traditional, knowledge, global, cultural commons and commoning aspects are all needed to capture (most of) seed commons capabilities. The empirics (chapter 5 *Findings*) further show how minor divergences in material assets can radically change sustainable social arrangements: Rice grain is both the edible produce as well as the seed. So, MASIPAG utilizes each farmer's farm decentralised and independently, meaning that every farmer can seed save for themselves (and sharing ensures seed quality and resilience). Vegetables need further processing to isolate the seeds from them. To maintain genetic seed quality, large vegetable populations are required for seed saving, resulting in quantities of seed too large for individual farmers to economically use. So, Kultursaat's breeders specialise in a few vegetable varieties and sell the (surplus) seeds. In a non-commercial commons setting like MASIPAG's, vegetable seed commons would need an organisational form with planned sharing and coordinated seed saving among large groups of farmers.

5. The importance of the material base is also visible in the temporal shift of the weight of different commons conceptions within the concept of seed commons. Short-term, seeds hold more characteristics of traditional commons, where a relative scarcity of seeds needs commons arrangements to tackle the collective action problem of over-exploitation. Long-term, however, seeds become abundant due to their reproductive vigour, and global commons arrangements to tackle under-provision problems gain importance. Seed commons arrangements need to account for both occurrences and stay flexible to account for changes in the material qualities of the resource they govern.

To operationalise individual well-being in a way that allows for qualitative judgement of seed commons as a property regime (and, really, one of the first empirical assessments of the influence of property regimes on individual well-being in general), the capability approach is adapted to the subject (chapter 3.2 *The Capability Approach for Seed Commons*). From the notion of property regimes as social arrangements it becomes clear that seed commons will not only influence the base of goods and services individuals can utilize to achieve capabilities but play into much wider areas of individual realisation of functioning. Influencing factors of individual preferences and decisions included in the capability approach which should be shaped by seed commons as social arrangements, comprise social norms, social influences on decision making, environmental factors and personal history, to name but the most important



ones. Property regimes thus indeed seem a valuable consideration if asking about individual well-being.

Methodologically, this thesis works with a transdisciplinary research design. This fits Robeyns' suggestion to draw up a capability list for a specific topic (in this case seed commons) from literature and then discuss it with academics and practitioners. Transdisciplinarity is also honoured in adding two more capabilities inductively formed from repeated answers in the qualitative, exploratory interviews, *living in and with concern for community* (referred to previously as capability 12) and *working for a human(e) future* (referred to previously as capability 13).

## **Empirical findings**

The thesis set out to answer the research question: *In what way do seed commons influence farmer-breeders' individual well-being, visible in the capabilities they enable or inhibit?* How are those capabilities met by seed commons in circumstances of affluence (Kultursaat e. V.) and scarcity (MASIPAG)? What does that imply for goods and their ownership modes in general? It argues that the way the well-being of farmer-breeders is influenced can be derived from their answers to each item of the capability list, as well as their furthering of it.

### *Findings for individual capabilities*

Some capabilities are more relevant for farmers than others (see chapter 5 *Findings*). Most important to farmer-breeders is beauty in life (*capability 11*), followed by a tie between creativity and critical thinking (*capability 5*) and connection with plants (*capability 9*). Notably, the favourites change to more pragmatic capabilities when answers of MASIPAG's coordinators and staff are considered. The top three then are: (1) beauty in life (*capability 11*; uncontested), (2) creativity and critical thinking (*capability 5*) in a tie with bodily health (*capability 6*), and (3) control over one's economic future (*capability 1*), as well as sharing of (seed) knowledge (*capability 3*) and personal connection to plants (*capability 9*).

To gain *control over one's economic future (capability 1)*, it is most important to farmer-breeders to build capacity to remain in control of independent farming through empowerment and seed sovereignty. The personal economic future is seen as intertwined with future seed sovereignty (MASIPAG) or detached from it (Kultursaat, as farming and breeding are not necessarily related in the

German association). In both cases, though, the value of future seed sovereignty is a motive for seed commoning. From a common's theory standpoint, views of seed commoners in affluent social situations (such as Kultursaat) are underrepresented. While subsistence farming does not apply to their needs, topics relevant to them, like public financing schemes and resilience in hybrid approaches of commoning and commercialisation, are overlooked so far. This is also because seed commons are predominantly viewed as traditional commons in literature, so global commons aspects (e.g., preservation values), which are relatively more important to Kultursaat's members, are underestimated.

Farmer-breeders experience *participation in political decisions (capability 2)* through seed commons in different ways. While Kultursaat's members are viewed as experts in society for their affiliation with the association, MASIPAG's farmer-breeders value the decision-making capacities they experience within the network. Besides factual political actions, it is a general shift of (relative) political power that is striking: farmer-breeders report to both feel empowered in their work and opinions and to be taken more seriously and regarded on an equal footing, by outside actors, including politicians and scientists. Farmer-breeders themselves see it as their prime political achievement and statement, however, that they are viable alternatives to predominant seed regimes.

*Sharing of (seed) knowledge (capability 3)* is inevitable for farmer-breeders, as knowledge links between seeds and information need to be kept intact to achieve seed sovereignty. Seed knowledge is embedded both in seeds and local contexts, so it needs to be shared along with the seeds. Yet, knowledge is not only preserved and shared, but new knowledge is produced by the actors: in breeding new varieties, in adapting seeds and farming knowledge to the specific circumstances of their farms and so on. To maintain embedded knowledge, which is a prerequisite for seed sovereignty, gaining, producing, and sharing knowledge necessarily flow into each other. Knowledge is also referred to as empowering. Yet, what empowerment through knowledge means depends on context: for MASIPAG's members, it is regaining (semi-)scientific knowledge, which has been stripped from Filipino farmers by increasingly mechanised and pre-configured conventional farming methods. For Kultursaat's members, it is precisely the opposite: the possibility to share experience-based personal knowledge, spiritual knowledge, and value-based knowledge, as most German farming focuses on highly professionalised knowledge.

*Excellence at one's job* (formerly *capability 4*) is a highly debated capability, as to whether personal excellence is important in a collective and value-based context. It is taken out of the capability list.

Farmers value *creativity and critical thinking* (formerly *capability 5*) and apply it directly to their farming. Depending on context, either critical thinking or creativity are deemed slightly more important.

Whether seed commons are improving or taxing *bodily health* (formerly *capability 6*) is regarded differently amongst MASIPAG and Kultursaat. Farmer-breeders in less affluent regions, where farming always involves intense physical labour, mainly report receiving health benefits. They do so not from the seed commons directly, but from the organic farming practices it involves, which provide them with diverse and safe food, void of pesticides. They make no distinction between seed commons and organic farming in their accounts, as one facilitates the other and their combination is logically necessary for them. For Kultursaat's farmer-breeders on the other hand, artisanal seed commons breeding is comparably more physically demanding than conventional breeding, as the latter is usually supported by machinery in their affluent surroundings. The regard of *bodily health* in connection to seed commons is thus context specific.

Regarding *psychological well-being* (formerly *capability 7*), farmer-breeders are on the same page in both organisations. They worry about their farms when they are away for multi-day meetings with their seed commons network. All in all, organising seed commons is a lot more work due to transaction costs, than individual farming practices, but farmer-breeders say that for them the benefits of exchange outweigh the costs. Another positive aspect for their psychological well-being is that they can work in alignment with their values, as they have created a niche where they have comparably many more ecological and individual freedoms in their work.

Farmer-breeders report the way they *give and receive support and respect* (formerly *capability 8*) differently to the expected outcome: it comes as much from within as outside the commons group, including village peers, customers, scientists, local politicians, financial donors and society at large. This adds two sentiments to the capability, which are pride for MASIPAG's farmer-breeders, and belonging for Kultursaat's. Kultursaat in particular, connects this giving and receiving to their core value of long-term sustainability, as for them, a natural part of belonging to a community is giving back.

*Personal connection to plants* (formerly *capability 9*) is formed for both MASIPAG's and Kultursaat's farmer-breeders through deep cognitive and

spiritual understandings of plants and their relation to humans. Some of MASIPAG's formalised practices are conducive to this connection, such as training farmer-breeders to closely observe their plants and the ecological cycles they are influenced by. The feeling of connection does not stop at plant level but extends to general environmental concern. Farmers understand their collaboration with plants, biodiversity, and ecological cycles not as optional, but necessary for the future of human food. An ontological shift occurs from one-sided claims humans hold towards plants to a more balanced, two-sided, and mutual relationship.

*Spirituality* (formerly *capability 10*) in seed commons work is recognised by the majority of farmer-breeders in both organisations. Plants are a spiritual source of fascination, inspiration, and role-models for personal development, to them. At the same time, religious relevance is denied (and consequently, religion is deleted from the capability description).

One of farmer-breeders' most favored capability is *beauty in life* (formerly *capability 11*). They refer to plants, the observation of natural life, and being involved in a community, as beautiful. Notably, the networks' coordinators do not assess this capability as particularly important. This gap might ensue from an emotional reaction to the capability questions, which coordinators cannot assume for the networks' members.

Two capabilities are added to the capability list of seed commons from the empirics of this thesis. *Living in and with concern for community* (formerly *capability 12*). It points to the research strand of collective capabilities, which have a double function for individuals: they provide capabilities, which are not possible to assess for individuals without the community, while also influencing and reinforcing commoners' value systems, determining which capabilities are desirable in the first place. Besides cherishing being part of a community and feeling motivated to maintain seed commons by knowing that they contribute to a community, farmer-breeders emphasise a value dimension of community. Just as in literature, farmer-breeders see shared values as the glue of their community and as its functional-organisational core. They feel that the continuity of their seeds lies in community and community values. In relying on values and value-based teaching, they can enhance seed sovereignty without having to apply fixed rules, which provides flexibility and organisational resilience.

In *working for a human(e) future* (formerly *capability 13*), farmer-breeders follow past and future generations in seed preservation, both because they inherited seeds from former generations, as well as to preserve them for coming

generations. To achieve this capability, farmers need awareness of plants' interconnectedness with their surrounding social ecological systems, as preserving seed systems is only possible, if the ecology, culture, knowledge, and values around them are preserved as well. This traces an arc to many of the capabilities described before and shows once more the intricacy and alignment of the seed commons structures with material, social, regulative, and ecological characteristics.

### *Reflection on methodology*

The capability approach fits well to the questions of this thesis. Interviewees mostly understand the eleven capabilities presented and can relate to them in a personal way which is meaningful to the research question. The process of setting up a list and then discussing it transdisciplinarily and recursively, prior to the interviews, enhances the quality of the seed commons capability list and allows for precise, accurate and deep answers from interviewees. However, even the preliminary review leaves two capabilities identified in literature being remodelled after gaining insights from the interviews themselves: first, the capability of *excellence in one's job* (former *capability 4*) is generally not deemed important by farmer-breeders and their answer to this question translates to other capabilities. Therefore, it is taken out of the final list. Second, while spirituality is an important aspect of seed practices and personal motivation for seed commons maintenance, religious belief is not found to be relevant by all except one farmer-breeder in the interviews (former *capability 10*). It is likewise removed from the list. The other capabilities show sufficient fit with the life and work realities of farmer-breeders regarding seed commons. The capability approach is also a good fit for the topic, as it explicitly allows for recursive research and alteration of capabilities due to actors' personal experiences and input. Hence, two capabilities are added, as farmer-breeders bring them up repeatedly: *living in and with concern for community* (now *capability 10*) and *working for a human(e) future* (now *capability 11*).

### *Circumstances of affluence and scarcity*

Circumstances of affluence (Kultursaat e. V.) and scarcity (MASIPAG) influence farmer-breeders' experience of capabilities. Seed commons are perceived as enhancing well-being in both contexts, because they are modelled in ways that fit the needs of commoners. This fit is specific to material, social and environmental contexts of MASIPAG and Kultursaat: While MASIPAG's farmers emphasise sharing of professionalised knowledge as beneficial, for

example, for Kultursaat in contrast, it is shared personal and spiritual knowledge that enhances their well-being. Each knowledge form fills a gap for the two communities, which farmer-breeders would not be able to fill without their seed commons network. Summed up, in MASIPAG's scarcity context (relative to other countries and within other professions in the Philippines), where farmer-breeders are mostly based on small-scale and subsistence farming, traditional commons concepts fit rather well to explain the motivation to maintain seed commons (with global, knowledge, etc. commons aspects enhancing the analytical picture). Secured and continued access to seeds is paramount. In Kultursaat's affluence context (farmer-breeders are on a similar pay level with the rest of the German middle class and well off compared to farmers globally), where farmer-breeders run commercial farms, access to seeds is less important, as buying seeds can be afforded. Seed quality, value-demands, as well as fair financing of breeding and the amount of physical labour in breeding become more relevant, and global, cultural and knowledge commons aspects are central to the seed commons concept.

### *Reflection of hypothesis*

This thesis is based on two related core hypotheses:

1. Property institutions influence behaviour and behaviour influences well-being; hence property institutions have an influence on the well-being of people who use them.
2. Seed property regimes have an influence on farmer-breeders' life realities and hence behaviour and well-being.

Behaviour is studied indirectly in this thesis through the personal accounts of farmer-breeders in the interviews, where they discuss their seed practices. In reflecting on capabilities, they assess their possibilities for action. Farmer-breeders describe seed commons as a central aspect of their farming realities. An array of practices is followed to maintain and develop seed commons, most of which are not necessary to undertake in private property seed systems. In the latter, farmers follow three core steps: information gathering on a suitable variety (abstract via sale information or practical in visiting seed trial plots), buying of the variety and sowing it according to company recommendation. In subsistence seed commons like MASIPAG's, farmer-breeders gather information through exchange with peers, experience, and observation. Seeds are obtained via storage, sharing, or buying with a larger array of seeds to choose from at once, as multiple varieties are planted. Additional seed practices of seed saving, quality control and, for some farmers, breeding are added. In

Kultursaats breeding seed commons, two separate lines of seed practices are deployed. The seeds farmers use for their commercial farming are generally obtained in a private property three-step process with more specialised quality standards. The breeding Kultursaats members do include seed saving, planting an array of varieties, as well as close plant observation. Seed commons institutions hence influence the behaviour of farmer-breeders in both settings. It is especially obvious that seeds in commons institutions involve more seed practices than seeds in private property institutions. Seed commons are more time consuming to use and require a redefined skill set for maintaining and breeding. Farmer-breeders report the seed commons enhance their well-being via the set of capabilities they enable them to choose from (hypothesis 2). For the case of seed commons, an influence of property institutions on farmer-breeders' well-being is qualitatively confirmed. Well-being for seed commons is, above all, the sovereignty they regain for the vital good of their profession, living and working in accordance with their values and being part of a community of likeminded, supportive peers.

How this applies to property regimes in general is touched upon in opportunities for further research.

## 7.2 Future Research Opportunities

While this thesis opens the field of well-being research for common property regimes, it can by no means be considered exhaustive. Both methodologically and in regard to content, it opens opportunities for further research.

### *Methodologically*

As an explorative study, this research has a narrow qualitative empirical base of around twenty interviewees. To back up findings on seed commons capabilities, it will be beneficial to conduct additional research with farmer-breeders of other seed commons organisations in Europe (e.g., Réseau Semences Paysannes), the US (e.g., KASSI Living seed commons or Open Source seeds), Asia (e.g., Navdanya), Africa (e.g., COASP) and so on. The revised capability list for seed commons (Figure 18 in chapter 6.3 *Refining the Capability List for Seed Commons*) can be a starting point for that endeavour, which assures a certain amount of comparability.

More research with the capability list for seed commons will also show if it stands the test of different circumstances and cultures, or if the list needs further revision. It might also show that each seed common is so contextual that a singular and generalised capability list cannot adequately capture seed

commoners' needs and abilities. However, the comparison of the two presented case studies set in varying contexts, promises at least core overlaps.

Qualitative, semi-structured interviews seem a good fit with the logic of the thesis. Other forms of data collection might bring additional benefits: a quantitative assessment of the capabilities on a Likert scale will make more and less relevant capabilities easily visible, for example. And focus group interviews, with their interplay between interviewees, can bring deeper insights into communal capabilities.

### *Furthering commons and well-being theory*

Apart from methodology, a realm of potential insights into commons and well-being theory is opened up. In commons theory, another potentially fruitful starting point for further research is to look at other agricultural commons, such as pasture and other land commons, machine sharing communities, agricultural open-source construction plans or producers' cooperatives. These may operate according to different logics from seed commons (as their material bases differ) and comparing them to seed commons will produce new insights into the working of agricultural commons in general.

Comparative studies between private property regimes and commons regimes for the same resource will give insights into the specific capabilities: where both systems are different, lay their focus, and so forth. Guiding questions can be: Which capabilities are deemed especially important in each property regime, and do they differ between property regimes? Are more or fewer capabilities regarded as (not) important by private property farmers and breeders? Do new capabilities need to be included? The same can be done for state property seed systems. Comparing the answers of farmers and breeders operating in different property systems, will reveal regime logics and show where emphasis is laid regarding well-being in the different regimes. In the logic of the capability approach, well-being is highest. When as many capabilities as possible are achievable for actors and communities, the seed property regime which can offer the largest variety of capabilities to its actors, will be the one with the greatest well-being effect.

The capability approach will benefit from further investigation into the relationship of property regimes and well-being. Especially in modern times, where well-being stagnates for affluent countries, while the logic of liberal capitalism is beginning to be questioned, taking a closer look at private property regimes (as the currently dominant property institution) promises to provide insights into how they influence individuals, societies, and the success



of both. Private property regimes are a system facet of modern societies, both manageable in terms of research size and central enough to capitalism that insights are valuable.

Using seed commons as a research case also raises the question of how narrowly a research topic is defined. In this case, how is the capability list different for seed commons, private property seeds or seeds in general (throughout different property regimes)? When drawing up the list, one expert interview was conducted with a conventional company breeder, who questioned some of the more intangible capabilities for their relevance to the topic. Further research should find out whether that is an exception, or common understanding amongst private property seed breeders and farmers. It should also be discussed whether that warrants a shortening of the seed capability list for private property seeds, and a special list drawn up for them. The capability approach itself argues that more capabilities are better, and from that perspective the idea of shortening the list for private property seed actors, may just show the reduced well-being private property seeds (can) provide (and a restriction of choice through adapted preferences, see Appendix F).

As a final point regarding the capability approach, my empirics suggest that value topics deserve special attention in capability lists. Both the possibility to live according to one's values, and the formation of and value strengthening through community values, are emphasised by the interviewed farmer-breeders. A regular theme related to value also comes from questions of sustainability and the future trajectories of coming generations. These points are strongly raised by the German farmer-breeders, as well as MASIPAG's coordinators and leading staff. It could be that value accordance gains importance for individuals in affluent circumstances, where their focus is free to shift to capabilities like sense and belonging. On the other hand, MASIPAG's farmers report that they are proud of helping others through their work, adding another layer of sensemaking to their participation in seed commons. As sustainability and mental well-being topics come to the forefront academically and politically in the 21<sup>st</sup> century, their role for individual well-being warrants a closer look.

The final topic, which flows throughout this thesis is seed sovereignty. While narrowly defined for seeds in this context, it opens more general discussions of sovereignty and re-democratisation. Further research should be conducted into the importance of sovereignty for individual and communal thriving. In my wider research of seeds, I have also informally been talking to some conventional German farmers to get a feeling for their relationship towards seeds. It sounds untroubled, habitually buying seeds from private companies is not

perceived as problematic, neither economically, nor psychologically. Might there be a threshold of enclosure or private pressure, where farmers start to reclaim seeds? Which factors contribute to communities of farmers adopting seed sovereignty as a relevant topic for them?

These are the most important questions I see as relevant for further academic exploration. From the results of this study I find, however, there are already a range of implications and advice that can be deduced for policy and praxis.

### 7.3 Implications for Policy and Praxis

Farmer-breeders regard seeds and their organisation as commons as relevant to their well-being. For societies that means that spaces for commons to exist need to remain open and should ideally be promoted. First and foremost, that requires keeping legal possibilities open for commons to exist. For seed commons in the Philippines that means ensuring it remains legal to share and sell unregistered seeds. Preferably, also making crop insurance possible for them. In Germany, that ideally means alleviating the strictness of the DUS criteria in registering seeds, to promote intra-varietal genetic diversity.<sup>195</sup> As a second-best option, parallel modes of registration should remain and be created with more flexible criteria. This is the current course, with options to register *conservation* and *amateur varieties*. Legislation varies from country to country and strategies to keep legal seed commons options open, and in which direction to push for further legal possibilities, have to be adapted accordingly. What is clear, though, is that it does require effort and lobbying, as seeds have legally become more enclosed, rather than open, in all countries in past decades. Both MASIPAG and Kultursaat have started from seed sharing and breeding as their goals and have both eventually begun political work as well, because it is necessary and will not be done by any other interest groups. Political involvement (and networking for the cause to give one's voice more power) is not an option, but a necessity.

For seed commons to exist, seed sharing must remain possible. That is, both legally and biologically. Legally, seed sharing is permitted in the Philippines. In Germany it is legally prohibited to share seeds, though usually no action is taken against the practice for hobby gardeners. Biologically, only open pollinating seeds are suitable for seed saving over the span of several plant generations, as their traits remain stable. Labelling in both countries usually indicates hybrids (F1) but it is not necessarily fully transparent as to which breeding

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195 A broad gene base in a variety, somewhat compromising uniformity.

techniques have been used. More importantly, few hobby gardeners and not all (small-scale) farmers are fully aware of the differences in the use of those seeds and which ones are suitable for seed saving. German farmers, on the other hand, are not allowed to seed save vegetable seeds in any case, but may also be reluctant to use OPVs and seed commons for fear of time-intensity and non-uniformity.<sup>196</sup> On the one hand, more OPVs and seed commons are required in general, and more informal seed markets in particular. On the other hand, a lot of communication remains necessary before all customers (farmers and gardeners) have a good understanding of which seeds – and accordingly, which capabilities – they are buying.

In fact, the latter seems the crucial point: seed commons are complex, and the issues of seeds, biodiversity, power, and future food safety are too simply discussed in mainstream media for consumers to gain enough understanding about them to make informed decisions. Seed commons and OPVs need to be made more visible in (social) media, (super-)market displays, gardening stores and everywhere else they occur.

Finding out how seed commons promote actors' well-being through the thirteen capabilities can serve as transformative knowledge for other property regimes. For simplification, the thirteen capabilities can crudely be clustered into values of empowerment and sovereignty, value-coherency, community, and re-shaping relations, as well as socio-ecological sustainability. Insights into the importance of these capabilities and values for property actors can now be transferred to private property seed systems, other commons regimes, and other private property regimes, in an act of wild arm-chair philosophy that should be read as suggestions and inspirations.

What could these findings mean for **private property seed systems**? The first question is whether actors in private property seed systems, like breeding and agrochemical companies (should) care about a set of capabilities developed for seed commons and OPVs. Maintaining biodiversity is also a future question for them, as there is no breeding progress without a sufficient pool of existing parent varieties. Current technical breeding and competition have shown to degrade biodiversity in the past decades, as few varieties are bred in bulk to generically fit as many areas as possible (see chapter 2.3 *Of Seeds and Humans*). The trajectory of this loss is not sustainable for private seed companies. Declining biodiversity is dealt with through ex-situ seed collections, where seeds

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196 Even though I am told by breeders that there are some vegetables where it does not make much of a difference in appearance and yield if OPVs are used or hybrids, like beetroot.

are isolated and frozen for decades. While they germinate again, modern studies about plant-microbial symbiosis (bacteria and fungi) suggest that a considerable factor enabling plants to thrive, lies in their microbiomes. These microbiomes do not sufficiently survive storage and need plant-soil interaction to stay adapted (Poza et al., 2021). Researchers are currently trying to design microbiome mixtures which can then be infused in soils, but breeding plants to optimally work with microbial symbionts is more promising than modelling microbiomes (Porter & Sachs, 2020).

Taken together, those points make in-situ conservation preferable to ex-situ storage. On-farm breeding has the additional benefit of fostering crop resilience through early adaptation to areas and soils. So, what breeding companies could do is experiment with smaller application areas for their varieties with a focus on local adaptation. That would also be an opportunity to include farmers in the breeding process early on. Besides accustoming varieties to differing conditions on decentralised farms, farmer empowerment is strengthened and a basic form of community fostered. Breeding companies can also experiment with open pollinating varieties rather than hybrids, at least for some vegetables, effectively increasing biodiversity. Legally, actors should lobby for a looser interpretation of the DUS criteria. In the long run that is a crucial step to maintain and rebuild biodiversity, as it is a foundation for enabling seed practices. Finally, hobby gardeners can be encouraged and taught to seed save vegetable seeds. While there will be profit loss, knowledge of seed practices is rebuilt and the work behind providing quality seeds appreciated.

What could the results mean for **common property regimes** in general? The resulting eleven capabilities can be kept in mind when building up and subsequently deliberating commons. They can be seen as factors which increase commoners' well-being and their motivation to stay involved. Consciously fostering the values mentioned above, adapted to the specific common property, is especially helpful. Commons communities should strive to encourage empowerment and sovereignty for their members (*capabilities 1, 2, 4, 5, 6, 7 and 11*), pay attention to value-coherency through regular discussions of core values, and incorporate their values into all decision making (*capabilities 1, 2, 6, 10 and 11*), foster community aspects, including support and knowledge sharing (*capabilities 3, 7 and 10*), and look out for connection possibilities with the world around them, which encompasses sustainability (*capabilities 8, 9 and 11*).

What could the results mean for **private property regimes** in general? Even if the values mentioned above are not central or inherent to private property regimes, they can encompass more of them to support the individual well-being of their users and customers. Empowerment and sovereignty can be

enhanced by promoting multiple functions (for example, showing how product packaging can be further used) and making goods alterable and repairable (for example, by building modular electronic devices). Companies can also promote the formation of responsible communities, for example, through local repair services or online platforms.

These are not new ideas; an increasing number of companies have been using these mechanisms in the past years, knowing that happy customers stay customers. It ultimately emphasises the core message of this thesis: there might be stronger links between property institutions and well-being than empirically researched up until now.

## **7.4 Takeaway**

Private property may at times be the solution which most enhances individual well-being for its users. Also, hybrid forms of property can function within private property institutions, incorporating elements of commons and supporting desired values. In most cases, however, private property is in place because companies, politics and research have not yet cared to check. If you take anything away from this thesis for your personal and professional life, let it be this: Alternative institutions to private property, such as commons, exist and should be considered routinely by individuals, practitioners, and policy makers. They may just have the power to transform our societies for the better and prepare them for well-being, sustainability, and resilience in complex futures.

As for the immediate research subject of seed commons: Seed commons enhance individual well-being for farmer-breeders both in communities of scarcity and affluence. In both cases, they are a source of pride, community, psychological well-being, and optimism for the future. Seed commons are modelled to the material and social goods they encompass. They are therefore likely to be the best property regime fit between farmer-breeders and their seeds. Underlying values may be the factor which makes them viable even in affluent settings, although less time intensive options, like buying seeds, are available.

Seed commons are valuable alternatives to private property seed systems and need to remain biologically and legally open for their value coherence, their continuation of seed practices, and their promotion of in-situ biodiversity maintenance. Farmer-breeders cherish them for their resilience, seed sovereignty and embeddedness into culture, and see them at the core of their profession as farmers. Seed commons are an immediate future and identity for farmer-breeders worldwide. Politics and societies should help them to continue to prosper and expand.

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## Appendix A: Matrix of Fundamental Human Needs

Table 4: Depiction of Max-Neef's Fundamental Needs (Max-Neef et al., 1986, p. 32 f.)

Table 1: MATRIX OF NEEDS AND SATISFIERS*				
Needs according to essential categories \ Needs according to ecological categories	BEING	HAVING	DOING	INTERACTING
<b>SUBSISTENCE</b>	1/ Physical health, mental health, equilibrium, sense of humor, adaptability	2/ Food, shelter, work	3/ Feed, procreate, rest, work	4/ Living environment, social setting
<b>PROTECTION</b>	5/ Care, adaptability, autonomy, equilibrium, solidarity	6/ Insurance systems, savings, social security, health systems, rights, family, work	7/ Cooperate, prevent, plan, take care of, cure, help	8/ Living space, social environment, dwelling
<b>AFFECTION</b>	9/ Self-esteem, solidarity, respect, tolerance, generosity, receptiveness, passion, determination, sensuality, sense of humor	10/ Friendships, family, partnerships, relationships with nature	11/ Make love, caress, express emotions, share, take care of, cultivate, appreciate	12/ Privacy, intimacy, home, space of togetherness
<b>UNDER- STANDING</b>	13/ Critical conscience, receptiveness, curiosity, astonishment, discipline, intuition, rationality	14/ Literature, teachers, method, educational policies, communication policies	15/ Investigate, study, experiment, educate, analyze, mediate	16/ Settings of formative interaction, schools, universities, academies, groups, communities, family
<b>PARTICIPATION</b>	17/ Adaptability, receptiveness, solidarity, willingness, determination, dedication, respect, passion, sense of humor	18/ Rights, responsibilities, duties, privileges, work	19/ Become affiliated, cooperate, propose, share, dissent, obey, interact, agree on, express opinions	20/ Settings of participative interaction, parties, associations, churches, communities, neighborhoods, family
<b>IDLENESS</b>	21/ Curiosity, receptiveness, imagination, recklessness, sense of humor, tranquility, sensuality	22/ Games, spectacles, clubs, parties, peace of mind	23/ Daydream, brood, dream, recall old times, give way to fantasies, remember, relax, have fun, play	24/ Privacy, intimacy, spaces of closeness, free time, surroundings, landscapes.
<b>CREATION</b>	25/ Passion, determination, intuition, imagination, boldness, rationality, autonomy,	26/ Abilities, skills, method, work	27/ Work, invent, build, design, compose, interpret	28/ Productive and feedback settings, workshops, cultural groups, audiences, spaces for expression, temporal freedom

Table 1 - continued

Needs according to existential categories Needs, according to axiological categories	<b>BEING</b>	<b>HAVING</b>	<b>DOING</b>	<b>INTERACTING</b>
<b>IDENTITY</b>	29/ Sense of belonging, consistency, differentiation, self-esteem, assertiveness	30/ Symbols, language, religion, habits, customs, reference groups, sexuality, values, norms, historical memory, work	31/ Commit oneself, integrate oneself, confront, decision, get to know oneself, recognize oneself, actualize oneself, grow	32/ Social rhythms, everyday settings, settings which one belongs to, maturation stages
<b>FREEDOM</b>	33/ Autonomia, self-esteem, determination, passion, assertiveness, openmindedness, boldness, rebelliousness, tolerance	34/ Equal rights	35/ Dissent, choose, be different from, run risks, develop awareness, commit oneself, disobey	36/ Temporal/spatial plasticity

The column of BEING registers *attributes* personal or collective, that are expressed as nouns. The column of HAVING registers *institutions, norms, mechanisms, tools* (not in a material sense), *laws*, etc. that can be expressed in one or more words. The column of DOING registers *actions*, personal or collective, that can be expressed as verbs. The column of INTERACTING registers *localities and milieu* (as times and spaces). It stands for the Spanish ESTAR or the German BEFINDEN, in the sense of time and space. Since there is no corresponding word in English, INTERACTING was chosen à *fait de mieux*.

## Appendix B: Property Regimes – Background Theory

Commons are one specific property regime; private property is another. But why and how do people own things?

As actors in modern society, we are inevitably surrounded by property, and things that could become our property, every day. Property has come to intrude on almost every aspect of our lives, reaching much further than the task it was once set out to accomplish - secure the basic tools for survival. We use property for a whole array of needs: we use our kitchen equipment for sustenance, our bicycle for personal mobility, our house as financial security as we age and our cat Lucy to catch flies – and for affinity. The latter example shows that property goes much further than mere satisfaction of material needs. It also serves purposes of deeper fulfilment. We want an elegant, light-grey cat for her aesthetic appeal, and a designer kitchen to show and secure our societal status. Philosophers have even gone so far as to ascribe things with identification purposes, by viewing them as extensions of the self (Simmel, 1908) or as tools for sense-making, as our possessions prevail even after our death (Adorno, 1966; Wesche, 2018). Even economists have leaned out of their discipline, by pointing out that the configuration of property rights has the power to change the behaviour of actors (Grafton et al., 2000).

This discourse takes a closer look at property and property regimes. It defines the concepts and discusses different understandings of the terms.

### *Property*

Property is simply things that are owned, like houses, cars, and potted cactus. While that sounds straightforward enough, more complex examples quickly come to mind and all of a sudden, property seems not so easily explained. Intangibles for example, can be property as well: ideas, protected by intellectual property rights, or some metres of airspace over a person's premises. The early English theorist Blackstone (1766; in Merrill & Smith, 2011, p. 81) puts the common understanding bluntly: property is the “sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe”. We assume complete and unchecked rule over the goods we own.

It is not as simple as that: On closer examination there are many restrictions. No society grants full ownership rights to all people, nor allows all resources to be owned (Carruthers & Ariovich, 2004). Children, for example, usually have limited rights to buy things without parental permission. Some goods that could be owned for centuries are now morally and legally excluded from possession, such as humans (sold as slaves). Other formerly irrelevant or even unknown goods just entered the realm of ownership rather recently, like the electromagnetic wave spectrum (since the use of radio stations) or atmospheric CO<sub>2</sub> (in the form of tradable certificates). Even the acquisition or use of certain things by adults with full rights may be restricted by requiring some prior licensing or training. In Germany, you need a hunting licence to buy a rifle, a drivers licence to operate your car or motorbike, and registration with the local authorities to keep a bull terrier.

Property is so natural to us and so ubiquitous that we realise only at a second glance, how vague the term and the concept behind it really are from an ontological perspective. The common understanding does not reach very far. Often, the term property is reflexively associated with private property. However, there is also common property, state property and things belonging to no one (no property).

From these illustrative examples it becomes clear that the reality of property is more complex than having ultimate rights to a certain commodity. It also comes as no surprise that scholars from various disciplines have investigated the matter and produced a multitude of literature on this topic. The founding fathers of modern economics (see Locke, Rousseau, Bentham, Mill, Veblen in Macpherson, 1978) have written about the conceptualisation of property and its role for social justice and equality. Their contemporary colleagues are concerned with the optimal configuration of property rights for economic efficiency and social welfare, as well as their role in economic development (Demsetz, 2009; Grafton et al., 2000; Libecap, 1993).

Their enquiry, however, does not stop at private property. Ostrom (and further works 1990), for example, conducts institutional economic research on common property. Other economists take public property and no property into account. Legal scholars have also been preoccupied with the topic of property, beginning with Blackstone (see Burns, 1985) and Honoré (1961), and extending to Heller (1999), Merrill and Smith (2001, 2007, 2011) and Penner (1995, 1997). Most of their research discusses optimal economic outcomes of property institutions, focused on the defence of either (a) an exclusivity, or (b) a bundle of rights, view of property. Early sociologists venture into the topic too, some prominently (Marx & Engels, 1846), some rather peripherally (Adorno,

1966; Durkheim, 1957; Simmel, 1908; Weber, 1923). Their enquiries are broad, describing the impacts of property institutions on society and individuals. After neglecting the topic for some time, modern sociologists now also acknowledge its important role in shaping human interactions (Carruthers & Ariovich, 2004).

The definitions of property vary across the disciplines and over time, mainly in their use of terminology. Two examples:

“Property is a claim that will be enforced by society or the state, by custom or convention or law”; “property as enforceable claims of persons to some use or benefit of something” (Macpherson, 1978, pp. 3, 6)

“Property rights are the societally accepted rights of individuals or groups of individuals to exploit assets for their benefit, with at least a partial right to exclude others.” (Grafton et al., 2000, p. 681)

While there is no final agreement on the core defining aspects of property, the different definitions that have been devised over the years show four commonalities.

The first is that property does not describe the material or immaterial asset itself, but the claims or rights to that asset. I might possess a toaster, but only if it is mine by right and some entity will enforce my claim if it gets taken away from me against my will, is the toaster my property.<sup>197</sup> Property can hence be understood as a short way to say *property rights* (Claeys, 2009b; Penner, 1997).<sup>198</sup>

The second important commonality is that an external body (*sovereign*) is needed to enforce these rights. From the different use of terminology here, *claims* and *rights*, it becomes clear that the body can, but need not be the state (see also E. Ostrom, 2008). While the state may pass and enforce (legal) rights, claims of owners towards resources which have been socially agreed upon by a group, can also be enforced – not by law, but by the group’s institutions. For example, a fisher who yields more than his agreed upon share from a common pool resource, fish stock (thereby interfering with the other fisher’s rightful claims towards the fish stock), might be excluded from further use by the user group on foundation of their negotiated institutions, even without legal or state

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197 German language makes a differentiation between “Besitz”, meaning to possess something (at the moment), and “Eigentum”, meaning to own something (even if currently lent to someone else).

198 The terms *property* and *property rights* are used interchangeably throughout this thesis. They include legally defined and socially agreed upon rights all the same.

support. Both definitions stress the social agreement to the rights, more than their possible legal foundation, and keep open who the enforcing body is.

A third repeated element in the definitions, is the intention of owners to make use of their property. What form that use takes is not defined. There are different rights to actions which owners might deem desirable to possess in order to use their property in a variety of ways. For example, the right to use the commodity itself and the products of that commodity, the right to manage the commodity and the right to give any of these rights away to a third party. These and similar rights<sup>199</sup> have been empirically derived from existing property structures (Honoré, 1961; E. Ostrom, 2008) and are neither exhaustive nor fixed.

Finally, a fourth repetition is the socio-political construction of property. In the definitions it can be read in the formulations of *societal acceptance* (Grafton et al., 2000) and possible enforcement through *custom or convention* (Macpherson, 1978), the latter inherently being social agreements. While the historical understanding of property in western societies was that of a natural right of men (famously dating back to Locke), existing prior to any social consensus, the possession of property is acknowledged as a human right today. As such, it is still non-negotiable and unalterable. However, its specific contents and configuration are subject to social and political agreements and as such no fixed state, but an ever-transforming socio-political construct, resting on re-negotiable social norms (see Macpherson, 1978).

Property is:

- (1) a right, or a bundle of rights, not a thing.
- (2) enforced by an external body if need be.
- (3) used by its owner(s) in some way.
- (4) an ever-transforming socio-political construct.

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199 The four rights described here are commonly known in new institutional economics (*property rights theory*) in Latin terminology as *usus, usus fructus, abusus* and *ius abutendi* (Palgrave Dictionary of Economics: Lueck, 2018). However, this set of rights is not fixed. One of the earliest and probably best known description of bundles of rights stems from Honoré (1961). He explicates eleven distinct rights and duties towards property: Right to Possess, Right to Use, Right to Manage, Right to the Income, Right to the Capital, Right to Security, Incident of Transmissibility, Incident of Absence of Term, Prohibition of Harmful Use, Liability to Execution and Residuary Character. Ostrom (2008) works with five use rights: Access, Withdrawal, Management, Exclusion and Alienation.

While property is defined as positive rights and rightful claims of owners, the concept always prominently includes duties and restrictions (Claeys, 2009b). Historically, two restrictions to property are especially noteworthy. One is the state's partial taking of property as taxes for the sake of maintaining the political institutions which protect property (Locke, 1690; also in Macpherson, 1978). The other is the appropriation of property in times of need for social welfare, mainly the opening of private granaries for redistribution to the public during famines (Smith, 1776). While the first restriction prevailed, the second is nowadays only used rarely, in exceptional circumstances, and with adequate compensation in most countries. A contemporary example is the appropriation of plots of (mostly uninhabited) land to build highways.

Honoré (1961) specifies three more restrictions in his essay *Ownership*, namely *The Prohibition of Harmful Use*, *The Incident of Transmissibility* and *Liability to Execution*. The first one, *Prohibition of Harmful Use*, is rather commonsensical: an owner is forbidden to use their property to harm others or their property. This restriction of use follows, by implication, from the safety and property rights of others. *The Incident of Transmissibility* describes the manifold constraints on the inheritance of goods such as additional taxation. Inheritance is highly regulated in many societies because it is a prime driver of social inequality over the course of generations (Carruthers & Ariovich, 2004). *Liability to Execution* means the exchange of property for its monetary value in case of an otherwise unpayable debt. Vice versa this restriction is logical as it prevents debtors from bailing out of repayment by transforming their solvent assets into untouchable material property. While these restrictions are all backed by law and social norm, some non-legal restrictions to property exist for practical reasons. Carruthers and Ariovich (2004) describe regulations informed by private standard-setting bodies, which do not forbid the ownership of certain supplies, but render them undesirable because it would not be possible to get them insured.

Besides these and other restrictions, the ownership of property usually also entails certain duties.<sup>200</sup> They may be social norms, like the culture of affluent elites in New York to engage themselves philanthropically by giving away part of their property to the poor or other social causes (Ostrower, 1997). Duties can also arise from legal regulations, such as the obligation to clear the stretch

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200 The German constitution explicitly (but generically) stresses social duties arising from private property: "Property entails obligations. Its use shall also serve the public good." (Ger.: „Eigentum verpflichtet. Sein Gebrauch soll zugleich dem Wohle der Allgemeinheit dienen.“, GG, Art. 14 (2)).



of pavement alongside one's house from snow in winter, prescribed by German communal law.<sup>201</sup> In property institutions of shared ownership, duties might also include the maintenance and upkeep of the commonly owned (im)material property, based on agreed upon social institutions. Taking turns cleaning the kitchen in shared flats is just one example.

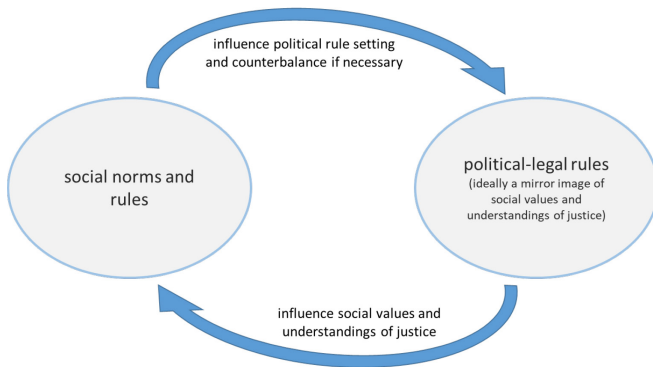


Figure 19: Interplay of social norms and rules with political-legal rules. Source: Own depiction

### Property as exclusion or as a bundle of rights

While the different use rights of property have been identified empirically, the view of property as a bundle of rights is also conceptually transferred into legal studies. There has been an ongoing debate in the past decades as to whether property rights should be understood mainly as exclusion of others from a resource (Claeys, 2009a; Katz, 2008; Klein & Robinson, 2011; Merrill & Smith, 2007; Penner, 1997), or rather as a bundle of rights (commons, 1893; Honoré, 1961; Coase in Merrill & Smith, 2011; E. Ostrom, 2008; Hohfeld in Penner, 1995). From the depth of this discussion, a lot can be learned about the details of property concepts and their expected impacts on society.

The **exclusion view** stresses the *in rem* rights of owners towards a commodity. *In rem* describes rights located in the resource itself. Thereby it marks owners' rights against all other humans simultaneously. The exclusion view proposes a clear and predictable concept of property, thereby facilitating market exchanges even across borders and cultures. Although generally fixed, property rights can always be specifically adjusted to situations. A fine tuning of rights

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201 Schneeräumpflicht; from 7am to 8pm from Monday to Saturday and one hour later on Sundays.

and a sharing of them with others can still be achieved by (a) legal restrictions (e.g., needing a license to drive) and (b) contracts (e.g., giving your tenant permission to use your property). The exclusion view of property still acknowledges constraints on property use where it interferes with other's rights (e.g., you are not allowed to use your golf club to smash somebody else's car windows). In short, the focus of this view is on the enforceability of the owner's rights against others. Researchers arguing for the exclusion view are convinced that the concept of property needs to have one defining and coherent nucleus of rights throughout all its variations – the owner's right to (at least partially) exclude others from their property. Katz (2008) assumes that the function of much of property law is to preserve the exclusivity of the position of the owner by ensuring their supremacy in relation to the rights and privileges of others. As a meta-proposition, this is more flexible than the previous idea. Summing up, the exclusion view is modelled to explain and manage private property institutions but falls short in many instances, to adequately describe the set of institutions which form public or common property in contemporary practice. In those property regimes, the legal ownership provides an inadequately unilateral perspective, because their defining characteristics are precisely the distribution of various use rights onto different, interplaying actors.

The **bundle of rights view** on the other hand stresses the inevitable presence of the multiple rights and duties an owner has towards a resource. These rights exist independently and can easily be split amongst a group of people. That makes the bundle of rights view helpful for the description of more complex and differentiated property regimes (like common or public property). The bundle of rights view has, however, been criticised in the past decades, both from legal scholars and economists, mainly for practical economic and political reasons (Claeys, 2009b, 2009a; Heller, 1999; Katz, 2008; Klein & Robinson, 2011; Merrill & Smith, 2001, 2011; Penner, 1995). Merrill and Smith (2001, 2007, 2011) stress that this view obscures the inherent *in rem* features of property, letting it appear rather as an ad hoc bundle of rights without a conceptually fixed core. If strictly a bundle, each owner would have to contract individually with all other persons or groups interested in the property in any way. That would produce impossibly high transaction costs (Claeys, 2009b, 2009a).

While this view is radical, already specific bundles of rights for a wide variety of goods in different legal systems (countries) would evoke a high transactional cost burden. For example, the rules to acquire a bicycle are strikingly different from those of buying butter or bread. While every society has a range of goods with special use rights, it is desirable from an efficiency stance, both privately and economically, to manage most goods in a clear and predictable manner.

Another argument against the bundle of rights view is its historical coming forth. It was promoted by the economic realist movement from the 1880s onwards, to facilitate redistribution of property, as “the bundle formulation tends to suggest that property depends on its being created, defined, recognised, and validated by the state—the maker and keeper of the implied list” (Klein & Robinson, 2011, p. 195), so that consequently “[c]haracterizing property as a ‘bundle of rights’ would make government intervention, not the violating of property, but rather the rearranging or redefining of the bundle“ (ibid.).<sup>202</sup> The market economy would face severe threats, if the security of private property was so diluted by an ever more complex and malleable set of rights, that people stopped trusting in their rightfully acquired wealth to be secure and used at will. This argument again seems like a radical if-then scenario, because many aspects of a bundle of rights understanding of property are already present in today’s societies (how else would the use rights comprising the bundle have been extracted from empirical studies?!). All in all the critique points to possible problems arising from a too fluid understanding of property in common perception, giving rise to the conceptual concern that “the modern bundle metaphor suggests more fluidity than appears in existing property relations” (Heller, 1999, p. 1189).

Both within the exclusion, and the bundle of rights view, it is possible for owners to extensively use contracting to model their property to their needs (Claeys, 2009b; Penner, 1997). The only difference lies in the explanation of empirical findings towards property: Are special use rights viewed as equal rights in a bundle of possible ones, or are they seen as an extension to the one, central right of excludability of others? The arguments against the bundle of rights view of property as stated above are rooted in an inherent understanding of property as private property and the belief in its central importance for contemporary societies. While this narrow view of property is prevalent, it is nevertheless obsolete. Public and common property, both property forms that are poorly explained by the exclusion view, have proven just as able to manage ownership. Scholars researching alternative property regimes for functioning societies, speak in favour of the bundle of rights view (Ostrom, 2008). Still, even common property and public property regimes share a basic (at least partial) right of excludability and without such a core it is difficult to describe the concept of property at all. Merrill and Smith (2001) come to a head in their critique of the bundle of rights view by quoting Williams (1998, p. 297):

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202 At the same time, the critical bundle view also positively served to deconstruct property as a natural right of men (see e.g., Locke, 1690, he fixed the idea of a natural right to God’s grant of the earth to men as their common property).

if “[l]abeling something as property does not predetermine what rights an owner does or does not have in it”, the term property is inherently left void of meaning.

Which perspective should then be taken towards property? An example of a use right towards a resource which is not legally one’s property might clarify the matter. Without owning a stretch of forest, every German citizen has the right to access forests for leisure and recreation (Ger.: *Betretungsrecht*), even if that forest area is the private property of someone else. In property terms, the law grants limited use rights to the public and, at the same time, limits the exclusion rights of the owner. In the bundle of rights view, every German citizen would then have a form of ownership of all forests. However, in common understanding one would not deem forests the property of every individual, but only the person who has more extensive rights towards the forest area in question. The consequence of changing that common perception towards a bundle of rights view, namely that all forests indeed are partially the property of every individual, would shift the understanding of property from private property towards a more open and extensive view of ownership. That view automatically hints at common and public property regimes, without failing to capture private property institutions as well. The analysis inevitably changes from distinct categories (private, common, state property) towards a continual spectrum of (sets of) property institutions. When comparing different property regimes, a theoretical basis needs to be able to capture the essence of all possible property institutions and the bundle of rights view matches that task.

While property rights have some explanatory power, they do not reach far enough to understand property’s influence on actors’ well-being. Commonly, the term property is understood narrowly as the legal grounding of private property, both in the interpretation of scientific and laypersons. To understand the consequences different forms of property have on individuals and societies, property must be fully understood as an institution, not only owners’ rights.

Until now, social and material concerns of property mostly remain external analytical elements in legal and economic understandings, instead of being granted their rightful place as conceptual cornerstones of institutions of property. In conclusion, this narrow focus on legal property rights and private property regimes turns a blind eye to various aspects of property which have additional impacts on actor’s well-being. For example, the social and informal institutions of property, their (im)material resource basis and interplays between the resource characteristics, society and politics concerning the resource’s management. All of them together shape how property is set for use in reality for individual actors, and help to blur the makeshift crayon lines

which divide scientific concerns in questions of private, common, or public property. The increasing use of the terms *property regimes* and *property institutions*<sup>203</sup> in the past paragraphs are therefore no terminological slip, but a foretaste of the comprehensive analytical concept this research will work with.

### *Property regimes*

“A *property regime* is the structure of rights and duties characterizing the relationships between individuals with respect to a specific good or benefit stream.” (Vatn, 2005, p. 255)

In contrast to property (rights), property regimes are set out to comprehensively mirror the life realities actors are confronted with. They include not only the rights, duties, and restrictions of property (which we have talked about before), but also specify who develops and ensures these rules, how they are linked to the (im)material base, how the actors (society and politics) interplay in rule setting, and what relations ensue between people in interacting over property. In common understandings of property, legal facts are stressed. The idea of property regimes adds to this view by including the (social/cultural/economic/political/ecological) contexts of these rights and duties and their emergence.

The property regime view serves to expand the mainly legal and institutional economic perspectives on property by sociological perspectives. In (institutional) economic literature the term can almost solely be found in commons literature, where it is customary to speak about common property regimes, or property-rights regimes (Schlager & Ostrom, 1992). This more comprehensive outlook is mainly promoted by commons scholars, as a mere rights-based view fails to describe this complex mode of resource governance. While focusing on written rights found in law, serves to explain a big part of private property regimes, common property regimes are more decentralised and rely heavily on informally negotiated social rights and duties.<sup>204</sup> In line with this, studies on

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203 Institutional economic vocabulary makes a distinction between the concepts of *institution* and *regime*. Institutions are “prescriptions commonly known and used by a set of participants to order repetitive, interdependent relationships” (E. Ostrom, 1986, p. 5), with prescriptions understood similar to rules, referring to “which actions (or states of the world) are required, prohibited, or permitted” (ibid.). While regimes describe “semi-coherent sets of rules, which are linked together” (Geels, 2004, p. 904). That means that property regimes consist of several property institutions.

204 Schlager and Ostrom (1992) would rather talk of the broader concept of social rules here. They make the following distinction between rights and rules: “‘Rights’ are the product of ‘rules’ and thus not equivalent to rules. ‘Rights’ refer to particular actions that are authorised (V. Ostrom, 1976). ‘Rules’ refer to the prescriptions that create authorisations. [...] For every

property regimes are usually descriptive and take a closer look at the resource in question, the rights and duties of actors regarding their property, as well as detailing how these rights and duties are negotiated and who has the power to do so.

Focusing on property rights<sup>205</sup> as the formal rules of property, turns a blind eye to manifold informal but prevailing practices. Those can be (1) grey (semi-legal) areas of action, as well as (2) actions not performed although legal. This varies greatly from one resource to another. Grey areas of action (1) might arise from gaps in the legal system or in cases where the formal law is strict, but prosecution is (intentionally) not carried out. An example is the practice of (German) home gardeners exchanging saved vegetable seeds, although it is forbidden by law to do so. The practice is tolerated, however, if it does not exceed sensible limits. (2) Many of the actions not performed although legal, are so commonsensical to us that analysing them in more detail seems tedious. For example, under normal circumstances nobody would throw a ring of gold into the trash, even if they do not wear it anymore, but discarding a similar piece of steel is commonplace. Yet both these actions are equally legal.

These examples illustrate that property rights do not only include legal rights (and restrictions), but also social ones, as defined in the past paragraphs. The hypothesis is then that throwing gold away is additionally inhibited by a social restriction, which includes cultural and economic restrictions: ‘You shall not simply discard your gold.’ In this simple case, as the resources are amply understood by people, a deeper analysis would indeed be superfluous – but only because we have internalised additional information about the properties of the (*im*)material resource aspects of gold and its *cultural value*. We know that gold is much more valuable than steel and throwing it out would be a personally unwise, financial loss. Equally, we know about the implicit *social sanctions* we would face when throwing the ring away and about their *enforcing bodies*: disapprovingly raised eyebrows (sanctions) of family and friends (enforcing bodies). The resources of seeds and varieties, which will be the heart of this scientific endeavour, are however much more complex and subject to expert knowledge. The introduced italics are some examples of property dimensions which the property rights view cannot adequately describe. Property regimes are fit to fill these (and more) gaps.

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right an individual holds, rules exist that authorize or require particular actions in exercising that property right. [...] all rights have complementary duties. [...] Thus rules specify both rights and duties.” (Schlager & Ostrom, 1992, p. 250).

205 More specifically, as defined above: property rights, duties, and restrictions.

To summarise: The concept of property (rights) focuses on the material and legal aspects of ownership, while the broader view of property regimes additionally takes social, cultural, economic, and political dimensions into account to describe ownership. Because the commons scholar's view is inherently analytical and an extension of the property rights view without curtailments of the latter, the regime perspective of property is just as well suited to analyse private property regimes.

Clear distinctions between private, public, and common property regimes cannot be made, a category view will always fall short. As stated earlier, property regimes are located on a continuum of configurations.<sup>206</sup>

Which rules are negotiated for goods are influenced substantially by the good's characteristics, which is why I encourage a resource centred view on property. What does it mean to centre the property regime view on the good's characteristics? For example, due to their potential harmfulness for self and others, guns and cars exhibit more detailed property regimes than the less perilous goods of, say, built-in cupboards or butter. Some property, like working cellphones, are automatically subject to an interlinked property regime because of their modularity (you need the phone *and* a contract with a provider). This thesis looks at reproducible resources (seeds) and knowledge resources which are subject to quality changes in reuse (varieties) – more on this in chapter 3.1 *Seed Commons*.

This resource-centred view means that a resource is always the basis for a property regime. Due to the differing properties described above, each resource has – at least one – distinct property regime. It is quite common to have the same resource managed in different property regimes across regions, countries, cultures, etc., as property regimes are social constructs. Seeds and varieties, for example, are managed in different property regimes (private and common property regimes) globally and even within a country. While it is possible to describe common, private, and public property regimes conceptually to a certain degree, to understand the impact of specific resources on actors' lives it is crucial not to make general assumptions.

Both institutional economists and sociologists have ideas about how to best analyse property regimes. Most helpful are the works of Helfrich and Stein (2011), Carruthers and Ariovich (2004), as well as Ostrom and Cox (2010).

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206 Because it is common parlance and used by the actors of my case studies, I will continue using the terms throughout this thesis. Note, however, that I understand them as generalized terms, which are not fit to show the variety of configurations within them.

The commons scholars Helfrich and Stein move beyond a static view of common pool resources by moving the processes of commoning into the centre of focus. For this they advise to take *material*, *social*, and *regulative* dimensions into account.<sup>207</sup> To describe a property regime, they then go through each of these dimensions to get a coherent picture.

The sociologists Carruthers and Ariovich want to understand the role of property for inequality and economic performance and have condensed five “dimensions of property” for qualitative analysis:

1. Objects of Property,
2. Subjects of Property,
3. Articulation of Use,
4. Enforcement of Rights and
5. Transfer of Rights.

These categories are helpful to further differentiate Helfrich and Stein’s three broad categories, to draw links between them, understand more about their interactions and have a starting point for the observation of power structures in property regimes.

Finally, the institutional economists Ostrom and Cox set out to diagnose the functioning of commons institutions for ecology, and developed the social-ecological systems framework (SES) as a progression of Ostrom’s institutional analysis and development framework (IAD; see E. Ostrom, 2005). The SES is assembled from “several primary classes of entities, which are in turn embedded in a social, economic and political setting, and in related ecosystems” (E. Ostrom & Cox, 2010, p. 456). These entities are resource systems, resource units, governance systems, actors, and action situations. Each of them is again specified on multiple levels with the help of (hierarchically organised) attributes. The resource systems, for example, are further specified by their 1. sector, 2. boundary clarity, 3. size consisting of 3.1. area and 3.2. volume and so on.

For this thesis, I do not describe seed property regimes in detail, as my focus lies on a qualitative analysis of how actors are influenced by the regime. Which parts of the property regime influence them in which way, would be a topic for subsequent studies. For that, an intricate description of the property regime in question will be inevitable. Still, keeping in mind the three descriptive categories, even for the present research, is valuable, so I describe them briefly.

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207 For this threefold separation of property also see Wright (2010).



**The (im)material dimension** specifies and describes the resource being managed in a property regime and provides criteria for its description by suggesting a set of characteristics, such as the resource's excludability of outside actors, its scarcity and reproducibility, its divisibility and movability. To describe the resource comprehensively, it is important to note that some resources are subject to changes in characteristics over time, for example due to reproductive processes (multiplication of seeds from one year to the next) or spoilage (most foodstuffs have diminishing value the older they get).

**The social dimension** is the most extensive of the three dimensions, as it includes social, cultural, economic, and normative perspectives. For analysis, the social dimension should be split into three main entities: (a) society, (b) actors and (c) economy. While the latter two are always embedded in the first, the connection of actors and economy can be more versatile. Actors may be fully or partially included in the economy or not at all. In any case some of their motives will differ, so a separate description is advised. The three entities can be described using the same analytical categories, which all harbour social, cultural, economic, and normative perspectives:

1. the entity in question,
2. norms & values,
3. rules towards the resource as property, as well as
4. enforcement and
5. transfer of these rules

Their sub-categories can vary somewhat. The society (a) should first be described by its institutions and organisations and their interplay (intra-societal). Then the understanding of the resource in society needs to be explained. Society has the power of social rule setting, so the last description of this entity should be concerned with the social bodies which exercise that power. The categories for subsequent descriptions of norms, rules, rule enforcement and transfer of rights stay the same for (a), (b) and (c). Norms and values might concern the resource-property regime directly<sup>208</sup> or reflect general norms and values held by society in terms of the resource-property regime.<sup>209</sup> The norms and values may or may not differ for the entities of society, economy, and actors. The societal/economic/communal and individual rules inherent in the

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208 E.g., cars are often ascribed values exceeding their factual material worth: "The car is Germans' most beloved child" as the folk saying goes. As an equal member of a German family, many a vehicle is affectionately bestowed both name and gender.

209 E.g., cars as symbols for the values of prospering and innovating the German economy.

resource-property regime can be explained with the help of the four segmentations introduced in the *property* paragraph, respectively: rights, duties, restrictions, and prerequisites. Similarly, the description of enforcement of these rules and their transfer possibilities should be conducted separately for all the entities.

The actors concerned with the resource (b) should be described in detail, specifying whether they are an individual or community, layperson or legal professional, and their general socio-economic and cultural background. For groups, the group size, network structure and leadership are additionally relevant. Their goals for the property, a history of their resource use and their special resource knowledge complete the picture.

For the economy (c) surrounding the resource, classical and alternative market characteristics can be described. Market size and growth should be considered, as well as the interplay of neighbouring and foreign markets, horizontal and vertical integration, and technology use. It can be beneficial to describe the main economic institutions and organisations concerned with the resource, their understanding of the resource and its organisation, as property and their goals.

To complete the description of the social dimension, the interactions between the entities of society, actors and economy should be explained. The social dimension is subject to ongoing processes of change and re-negotiation. These changes over time need to be accounted for in the dimension's description. The focus should be upon the rule-setting power of one entity in regard to another, as well as the quality of interactions between the entities.

**The legal-political dimension** describes the qualities of the state's involvement in the resource-property regime. The analysis of this dimension is concerned with the description of the political actors, legal regulations, as well as policy making and their changes over time. Part of this is, again, the description of legal-political rules, enforcement, and transfer. Norms and values, however, are not of concern, as the legal-political system cannot define their own norms and values but defines them in negotiation with the society and the economy and then translates them into laws and regulations.

**The interplays between the material, social and legal-political dimensions** are described in the following paragraph. As both the social and the legal-political dimensions are extensively concerned with rule-setting, the interplays between these two are especially multi-faceted and relevant for the understanding of the resource-property regime.

The *interplay of the material and social dimensions* is mainly concerned with the distribution of the resource among actors, while the *interplay of the material and legal-political dimensions* looks at the changes to the resource's attributes through legislation. Most complex is the *interplay of the social and legal-political dimensions*, which takes a deeper look into the reflection of social norms in law, grey areas where social actors wish to have more legal freedom and vice versa, and private regulation where social actors wish to have more legal parameters. Practices not undertaken, though legal, should be identified as central concerns in regard to what actors know they are able to do. All the above, could be more succinctly described as areas where *de facto* rules differ from *de jure* rules.<sup>210</sup> Lastly, the distribution of legal rights, duties, prerequisites and restrictions among actors is considered, as well as the influence of communal, social, and economic actors on legal rule setting and policies (rule-setting power).

The final step of qualitative analysis should take all the above dimensions into account to **extract the *de facto* use rights of actors in the resource-property regime**. Those use rights will be similar to many rights described in the various bundle of rights theories, and depict which actions can, and are, undertaken by the actors regarding the resource.

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210 This points towards social circumvention of ownership possibilities in law. For example, it is often allowed by law for women to own land in paternalistic societies, but in practice the husband can exercise her ownership rights. This is also a power question.

## Appendix C: The History of Seeds

Being aware of the history of seeds helps in understanding some motives for the creation and maintenance of today's seed commons. How have the existing modern crop varieties developed from the wild plants we still find at the seams of our agriculture plots today – and why?<sup>211</sup>

It is a coevolution story of crops and humans. The first hunter-gatherers settled in the fertile valleys of the Middle East about 11,000 years ago, where they became farmers. The start of farming is at the same time, the start of breeding, because ancient farmers took special care of those plants within a plant population which showed desirable traits, giving them advantage over their siblings. In the Middle East, for example, where barley was bred from native sweet grass as humanity's first crop, this meant selecting tufts of grass where, fortuitously, grains stuck to the panicle or grains were a tiny bit heavier than on the grasses around. Over time, our contemporary crops developed in this way around the world.<sup>212</sup>

For thousands of years, this system stayed in place. It was only around 1800 when the wheel of breeding professionalisation was set in motion – although slowly at that point. It did so for two reasons: First, the British economist Malthus warned in his essay *The Principle of Population* (1798), that exponential population growth will be unsustainable with linear expansion of food production. Politicians and economists feared an impending food crisis. Second, the industrial revolution was thriving and a perpetual flow of workers from the countryside was needed. They were only made available when innovations led

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211 This history is re-narrated based on the comprehensive anthologies of Kloppenburg (2004) and Banzhaf (2016).

212 Regions with especially outstanding biodiversity for specific plant or animal species are called biodiversity centres or Vavilov centres. The Russian ecologist Vavilov (1887–1943) has identified these areas around the globe as the places where species have most likely been originally found and first domesticated. Hence that is where they had most time to develop (or be developed) into myriads of different, specialised varieties. Examples are the apple tree forests of Kazakhstan, the abundance of potato varieties in the Peruvian Andes and the splendour of Philippine rice and chicken breeds. Europe, I am afraid, is rather underequipped on that front. Most crops we sow and feast on today have been introduced sometime in the past. Truly native crops are pretty much only raspberries, turnips, and kale.

to more efficient and less labour-intensive farming, so fewer farmers were needed to supply the same quantities of food. One opportunity for more yield with fewer working hours was provided by improved varieties, and some pioneers pursued breeding as a profession from that time on. In 1900, one farm only fed four people, which translates to subsistence agriculture for the farmer's family (Hemmerling et al., 2012).

But efficiency was about to substantially increase. What changed that same year, was the rediscovery of Mendel's crossing experiments started in the 1850s (Mendel, 1865). Mendel found patterns in genetic inheritance, which lifted breeding from the farm fields into the ivory tower of science. It was pursued in public research facilities and universities from that point on. Soon after, agricultural revolution was on the verge with two major discoveries: first the heterosis effect, achieved through hybridisation (crossing of inbred parental lines), leading to substantial yield gains for some crops (an extreme is corn, with yield gains up to 50%; Sprague, 1983) in 1908. Second, high pressure chemistry, invented by Haber and Bosch in 1911, to synthesize nitrate from atmospheric gas<sup>213</sup>. With continuing inventions in breeding technology and new high-yielding varieties, pressure increased to protect these novelties with some sort of intellectual property to further incentivise innovation. Thus, the pursuit of technological innovations influenced law and societal values, and variety licensing was set in place from the 1930s on, leading to restriction of farmers' privileges. In practice, this means that when saving seeds for the next season, farmers now had to pay royalties to the variety owner. With this and similar incentives, competitive markets emerged with the aim of increasing farm outputs. From an economic efficiency perspective, these efforts were not in vain: by 1950 one farmer could feed ten people (Hemmerling et al., 2012) – farm productivity had more than doubled within half a century.

The matter of food production increase seemed even more pressing with the backdrop of several severe famines accompanying World War II around the globe. Millions starved to death in war conditions in the former UDSSR and China (Garnaut, 2013; Wheatcroft & Gráda, 2017), and under colonial war policies in Vietnam, Iran and India (Gunn, 2011; Majd, 2016; Sen, 1980b), to name but a few. A devastated Europe and weakened US feared famines of their own. Concerted efforts to increase food production ensued and the narrative of *feeding the world* became a mantra we still hear today (McMichael, 2009; L.

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213 While revolutionising agricultural fertilisation, high pressure chemistry was originally invented to produce explosives during World War I. After the war ended, the costly nitrogen-producing industry searched for new markets – and found a splendid one in agriculture, where their produce has since been used as chemical fertilizer (A. Howard, 1940).

Phillips & Ilcan, 2003) – letting concerns of social and environmental costs fade into the background.

With this moral and financial incentive, more and more private enterprises entered the breeding market in the 1950s. The following decades from the 1960s on, now known as the Green Revolution, were a success story of industrialised, high-input agriculture (Kirschenmann, 2007).<sup>214</sup> Technologies and improved varieties from developed countries were broadly disseminated throughout developing countries. Yields per acre kept rising globally, while the farming workforce shrunk. This was made possible with increased energy inputs in agriculture. For every calorie produced in food, ten calories of fossil fuel were needed to power farming machinery and produce agrochemical inputs (Herren, 2011). While the Green Revolution succeeded in increasing yields, its impacts were not unequivocally positive. Socially, hunger and poverty were not necessarily reduced through higher yields, as both challenges proved to be multidimensional (Pingali, 2012): today's developmental sciences know that hunger is not foremost a matter of availability, but access (The Hunger Project, 2021). Poverty could be reduced for farmers in favourable agricultural areas, where yields of the improved varieties exceeded higher input costs for chemical-synthetical fertilizers and pesticides. In marginal farming areas, however, the farmers' plight increased with the adoption of modern varieties, as they required high investments for seeds and accompanying agrochemicals (Bachmann et al., 2009; Shiva, 1991). From a sustainability standpoint, the Green Revolution proved somewhat short sighted. Not only is modern agricultural production heavily reliant on fading fossil fuel inputs, through the global adoption of only a few varieties, an estimated 75-90% of plant genetic diversity was lost, as farmers abandoned traditional varieties in favour of modern ones (Barbieri & Bocchi, 2015; FAO, 2004; Pautasso et al., 2013).

The most recent decades of seed history were marked by accelerating technologisation, extension of legal intellectual property options and market consolidation. The genetic modification of plants (GM technology) was feasible from the 1970s on and made it interesting for new players to enter the market. Agrochemical companies realised that genetic engineering provided a means to mould seeds to their fertilizers and, foremost, pesticides (Tilman et al., 2002). They sold these agricultural inputs as package deals – seeds and their

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214 Whether the Green Revolution should be seen as a success (Evenson & Gollin, 2003), a mix of success and challenges (Borlaug, 2000; Pingali, 2012) or more harmful than helpful, is still debated in science.

corresponding agrochemicals. This way, the labour intensity of weeding could be cut out of industrial farming processes completely. The agrochemical corporations were economic giants compared to the myriad of family-company sized breeders and started using their financial advantage to buy them up. With their growing political influence, they pressed for more exclusive intellectual property rights. In the 1980s, the first US patents were granted on crop plants. This marked a shift in seed governance logic: throughout the modernisation of the seed market, farmers' and breeders' privileges<sup>215</sup> were officially kept in place, but patents curtailed these de facto practices. Farmers and breeders could be prosecuted by law for using patented seed for any other purpose but the one intended by the company, and this intention was that farmers should buy the exact amount of seed to be planted that year. Seed saving, own breeding or even keeping bought seeds for next year's use were now prohibited. Finally, from the 1990s on, market consolidation took place amongst agrochemical corporations. Today, few companies control high shares of the global formal seed market (Bonny, 2014; P. H. Howard, 2015). Various alternative systems and forms of protest have developed in response, which are described in chapter 2.3 *Of Seeds and Humans*.

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215 Farmers' privilege describes "the practice of farmers sowing crops with saved seed" (P. W. B. Phillips, 2007) and breeders' privilege or plant breeders rights (PBRs) "allow the use of others' proprietary germplasm when breeding new varieties" (Moschini & Yerokhin, 2007), meaning that breeders have access to all given varieties to use as parent material for novel breeds.

## Appendix D: Breeding Methods – An Overview

Every breeding process passes through three general steps (Messmer et al., 2015). First, genetic variation, second, selection, and third, conservation and propagation of the new variety. Each of these steps can be undertaken in different forms, many of them listed here (following *ibid.*).

### *Step 1: Production of genetic variation*

**Crossing** (plant level). Crossing is the simplest controlled technique to produce genetic variation. As described in chapter 2.3 *Of Seeds and Humans* (in the *Crossing and selection* box), plants of two distinct varieties are chosen as mother (emasculated) and father plant, then crossed with each other (by fertilizing the mother flower with pollen from the father plant) to mix their genes. Offspring are then selected for desired trait combinations of the parental plants.

**Induced Mutagenesis** (plant level). Mutations occur constantly and naturally in genes of all organisms. Most of them are minor and not necessarily expressed notably. Yet sometimes, new wanted traits develop.<sup>216</sup> To increase the likelihood and extent of mutations, they are induced technically (temperature shocks, radiation with UV, x-rays, or neutrons), or chemically. The method can be applied to whole plants or plant parts, such as seed, pollen, or tubers. Seeds are then produced from the treated plant (parts; if it was not seeds that were treated) and offspring selected.

**CMS – cytoplasmic male sterility** (plant level). Plants can be male sterile if their mitochondria (organelle only found in plant cells) malfunction. This has been described as a natural occurrence, but can also be induced technically. Male sterile lines make crossing easier, especially for hybrids, as no emasculation is required and self-pollination is precluded. In that sense, the technique does not strictly produce genetic variation, but ensures that genetic variation is as high as possible in crossing.<sup>217</sup>

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216 Statistically, most mutations have undesired effects. They are not selected for further breeding.

217 Female flowers can be pollinated by several different pollen simultaneously (*polyandry*). The resulting genome is then a mix of more than two plants. This means that plants can also simultaneously cross- and self-pollinate and the offspring is genetically closer to the mother



**Cell fusion** (cell level). In the two different processes of cell fusion, protoplast and cytoplasm fusion, cells of different plant species are recombined. Cell walls are chemically disintegrated, and the resulting cell content mixed into one new cell. Depending on the kind of fusion, this includes the fusion of cell nuclei and hence the nuclear DNA (protoplast). Or the nucleus of one cell is destroyed and only its cell organs, like mitochondria and mitochondrial DNA are transferred into the other cell (cytoplasm). Mitochondrial DNA can carry resistances of its own or induce other desirable functions in combination with the nuclear DNA of the second parent plant. Cell fusion works for plants which could also be crossed naturally but can overcome natural crossing barriers by recombining cells of plants, which would not naturally cross. It is a method to rapidly achieve crosses which would otherwise be impossible or need one or several difficult intermediary crossing steps.

**Gene transfer** (DNA level). Desirable traits are identified on the genome of plants (that would not cross with the breeding material) or other species (such as bacteria) and transferred into the DNA of the plant breeders wish to inherit the trait. Gene transfer is achieved directly (by introducing the DNA sequence into cells of the receptor plant) or indirectly. Indirect methods include inserting the relevant DNA into a bacterium and infecting plant cells with it, or coating gold particles with the DNA sequence and shooting them into the plant's cells. An additional reporter gene is transferred with the desired DNA to make successful transfer detectable. Linking genes to herbicide resistance makes it possible to check for successful DNA integration (into the target plant's DNA) by applying the herbicide, for example, as plant cells with successful gene integration will survive. The technique is not precise and has a low success rate. It is therefore expensive, due to the laboratory and equipment needed.

Gene transfer is a genetic engineering technique. Various similar techniques exist, which I am not going to explain in detail. Examples are zinc-finger nucleases (which cut the DNA at specific code triplets, making it more directed), gene silencing (where RNA parts are introduced into a cell which prohibit the expression of certain DNA traits), or the crafting of mini-chromosomes (which can then transfer more foreign DNA into a plant than other techniques).

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(from which it inherited the egg genome, plus part of the pollen genome). CMS prevents self-pollination, ensuring 1:1 inheritance of father and mother, which produces the most diverse genome set an offspring can have.

## *Step 2: Selection*

Selection means choosing plants with the most desirable traits from a plant population according to criteria derived beforehand from specified breeding goals. Selection is repeated for several plant generations (usually about seven) until a stable variety is obtained.

**Phenotypic selection in the field** (plant level). Plants are selected according to looks and observable traits. This step must be carried out repeatedly as environmental influences conceal genetic effects, especially for the first few generations after crossing (or other forms of genetic variation production). Phenotypic selection is an element of all breeding processes and has been the basis for humanities' first selective breeding.

**Analytical selection** (plant level). Traits which cannot be detected by phenotype, such as nutritional qualities, cooking, or baking performance, are tested in laboratories. Again, plants with desirable traits are selected on this basis.

**In-vitro selection** (tissue and cell level). Plants are selected in a laboratory, where they (or their cells) are grown on artificial mediums. This medium can be altered to test for environmental stresses (modifying salinity or pH-value) and resistances (infecting it with fungal pathogens). In-vitro selection is used as a quick form of pre-selection to reduce the number of plants that must be grown in the field. It shows traits precisely and is cost-efficient.

**Marker-assisted selection** (DNA level). DNA strands naturally include sequences which can be made visible with diagnostic acids. Once a trait has been linked to a succession of genes, this pattern can be identified with two genetic markers: one preceding it and one following it. Molecular markers are a diagnostic tool, which make specific traits visible (if gene sequences corresponding to the trait are not dispersed amongst the DNA strand too widely).

## *Propagation*

Propagation describes ways to multiply plants.

**Generative propagation** (plant level). Propagation of plants through seeds is called generative propagation. Plants grown from seeds contain genetic material from the father and mother plants.

**Vegetative propagation** (plant level). Multiplication of plants by replanting plant parts (e.g., cuttings, runners, tubers, division) is called vegetative propagation. This technique is possible, as plants can fully regrow from even one

cell.<sup>218</sup> It is asexual, as the offspring is a clone of the donor plant. Vegetative propagation material has shorter storage time than seeds and is often treated chemically to prevent the spread of diseases and induce rooting. For plants with a highly varying genetic base, which would exhibit very different traits, vegetative propagation is the only way to receive stable offspring of a variety. This is true for many fruit trees, such as apples.

**In vitro propagation** (tissue and cell level). Plant parts are cultivated on sterile nutrient mediums in laboratories to form new shoots (clones of the donor plant). These can then be planted *ex vitro*. *In vitro* propagation is a fast and space efficient way to reproduce plants. Artificial phytohormones<sup>219</sup> are used in the process.

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218 This does not happen under environmental conditions but can be successful in laboratories. See *in vitro propagation* below.

219 Plant hormones, which regulate plant growth.

## Appendix E: Normative and Practical Specifications of the Capability Approach Prior to Application

One general normative and one practical challenge of choice need to be addressed before applying the capability approach to seed commons:

**Normative grounding.** Not all capabilities researchers and research participants might draw up are necessarily ethically desirable. The selection of capabilities should be informed by what actors have *reason to value*. The norms these reasons translate to should be made explicit in a *normative base theory* developed specifically for each application of the approach.

**Restrictions of choice.** Two practical problems of measurement are related to the approach's focus on individual choice. First, humans are socially embedded. The approach thus needs to account for social influences on actors' choices. And second, actors might self-censor their choices due to their socialisation (adaptive preference) and thus have blind spots regarding capabilities which would be desirable for them.

Both challenges are discussed extensively in literature. Here is an overview and explanation of how I approach these issues in my research.

### *Normative grounding – avoiding unethical capabilities*

As the capability approach per se does not predefine a normative view, it has been criticised as being open to problematic interpretations (Robeyns, 2003). These could be racist, sexist and so forth. An example: When procedurally developing a list of capabilities in a community with strong nationalist outlooks, some of them might sound something like “the ability to live without foreign neighbours” or “the ability to not be influenced by foreign culture”. Capability scholars have discussed two ways to avoid this problem.

### **First option: Selecting “capabilities actors have reason to value”**

It has been said above that Sen refers to capabilities people have *reason to value*. What is meant by that? Sen (1993) points out that not every possible being and doing will enhance an actor's well-being, some are even harmful to them, to other people or to the wider environment. This is why he suggests

reasoned choice to prevent unethical decisions. He sees reason as a regulatory guide impersonated in every actor. His belief in reasoned choice (in contrast to rational choice, which implies self-interest as the only motive for acting) follows the ideas of enlightenment where “Reason [is] a force for good” (Kleine, 2013, p. 23).

When critically reasoning about possible beings or doings, implications of the action for other beings now and in future should be considered, as well as whether the action is truly beneficial for the person themselves. A reasoned examination of the achievement of flying to Bangkok for a weekend of partying would then reveal certain desirable outcomes for the person, like a diverting anecdote to tell peers and resulting transient social approval. However, at high cost for the environment and possibly the person’s health. It is therefore arguable if that would be a doing the person has sufficient reason to value – although he or she might spontaneously value it. All in all, only those capabilities which the actor has sufficient reason to value are relevant for the assessment of that actor’s well-being in the capability approach.

In principle, the condition of reasoned choice should be enough to protect a society and the environment from selfish behaviour – the praxis, however, differs. This is one reason for an explicit, discussable normative grounding of the capability approach – and a careful selection of reasonable capabilities only, thereafter.

### **Second option: Explicating a normative base theory**

Although Sen does not pose a fixed normative base, he is well aware that one is needed for an application of the capability approach: “While the identification of value objects and the specification of an evaluative space involve norms, the nature of the norms must depend on precisely what the purpose of the evaluation is.” (1993, p. 35). So, to rule out the emergence of discriminating or otherwise ethically undesirable well-being criteria and to create an evaluative space, a normative base theory needs to be established.

The normative base is reasoned specifically for the context of the application. For this, values which are present in the discourse are collected and critically reflected. For an agricultural context, this could be food security and efficiency, but also fair remuneration and ecological sustainability. From a developmental standpoint it can also include deliberating desirable values that are currently missing from the discourse. In agriculture, for example, values of food sovereignty and re-democratisation.

Besides sound values, Robeyns (2003) and Kleine (2013) note that it is also important that the groundwork will be able to capture common challenges in the field of research and, in the case of instrumental goods, their basic qualities. In Robeyns' work on gender inequality, for instance, she points to the importance of the normative base acknowledging the gendered nature of society and people's interconnectedness (2003, p. 67). Similarly, Kleine defines her outlook on development, by focusing it on the enhancement of people's choices instead of economic growth (2013, p. 30).

Is drawing up a normative base authoritarian? After all, it defines which outcomes are ethically desirable for the research case. It also ultimately determines which capabilities will be included in the list and which not. Whether it is authoritarian or not, depends on the content of the normative base. Up to a certain point, normative constraints are necessary and approved by most modern societies. The showcase example is a limitation that is written into most democratic constitutions: an individual's freedom is legally constrained at the very point it starts to violate another individuals' freedom.<sup>220</sup>

There is another argument for the setting of a normative base. Every human work has a normative standpoint because no social action is free of it. Making the implicit, normative underpinnings of a scientific thought visible is an important prerequisite for its critical examination. The need to make the normative grounding of the research subject clear before applying the capability approach is a valuable step towards a more reflective social science.

### **A normative base theory for capabilities of seed commons: What should seeds do for people and their well-being?**

This research gives a nuanced account of the influence common property regimes of seeds have on actors' well-being. The normative base should therefore be oriented towards the most profound values that people are seeking to materialize through the use of goods and services, among other things. As described in earlier work (Gmeiner et al., 2020), a rather fixed set of values is connected to property. The initial motive to own property is *individual security*, owning ones' own tools and weapons made sure a livelihood could be sustained. Further ethical considerations on the true relevance of goods and services are then made by prominent economic figures, namely John Locke (1690), who "first linked the concept of *individual freedom* directly to the

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220 See for example the German Grundgesetz (constitution), Article 2: "(1) Every person shall have the right to free development of his personality insofar as he does not violate the rights of others [...]".

concept of private property” (Gmeiner et al., 2020, p. 2). Adam Smith later on solves the puzzle of individual freedom versus *societal welfare* when he states that a functioning market economy can achieve both simultaneously (Smith, 1776; Becker, 2011). While these values are still worth striving for today, additional challenges rise on the verge of the new century. One of them is the pressing need to stay within the planetary boundaries to make it possible for future generations to also live well. The value it manifests in is *social-ecological sustainability*. Another is the rise of overarching economic and cultural global powers, which re-focus attention on the *sovereignty* of individuals and communities, as well as a call for the continued right of political co-determination, best described as *re-democratisation*. The new challenges give rise to a novel form of property regime, progressive commons. This mode of property organisation incorporates the last three values mentioned (social-ecological sustainability, sovereignty, and re-democratisation). Most noticeably, however, while having a new focus, the modern value claims towards property still include the traditional ones, and the authors believe this to be a renaissance of the traditional values. I therefore argue that the value set embodied by new commons are not only the currently most modern value claims to property, but above all the ones fit for the future of individuals and humanity. I will use them as a normative base for my application of the capability approach because the challenges of modern societies are directly reflected in them.

Sound values are not the only requirements for the normative base. Robeyns (2003) and Kleine (2013) note that it is also important that the groundwork is able to capture common challenges in the field of research<sup>221</sup> and, in the case of instrumental goods, their basic qualities. For seeds and varieties this means (1) to acknowledge their importance for humanity as the most basic input factors for the production of food. In a hypothetical scenario, should all crop varieties fail at once, not only plant-based nutrition will be lost, but also most of our livestock, as its need for feed exceeds the natural vegetal supply. Food security is therefore directly linked to seeds and varieties, their quality, diversity, and access to them. While it is unlikely that all crop varieties will fail overnight, the increasing deterioration of crop biodiversity is well underway (MEA 2005; van de Wouw et al., 2009; Geiger et al., 2010) and what currently sounds like a future dystopia might be a threat to the generations of humans to come. It is necessary that the preservation of seeds and varieties and the allocation of responsibility for the task

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221 For example, for Robeyns’ work on gender inequality it is important that the normative base acknowledges the gendered nature of society and people’s interconnectedness (2003, p. 67). Kleine defines her outlook on development, by focusing it on the enhancement of people’s choices instead of economic growth (2013, p. 30).

of food security for this generation and following ones, can be reflected in the capabilities (which are designed upon the normative base). The value of *social-ecological sustainability* allows for this consideration.

The normative base also needs to be capable of reflecting (2) the power relations present in the economics of seeds and varieties, their origins, development, and aggregation in specific actors. Aspects of these power relations have recently been pulled into the public spotlight with critical articles about the planned merger of major seed and agrochemical corporations and related concerns about possible, monopoly-like market failures (Lownsborough, 2017). Most of the power in the seed and variety market is, however, subtler and already deeply rooted in the same society which criticises its peaks. A critical account of power in this field consequently needs to be fit to look deeper into the topic and raise more complex concerns. These include the societal and political understanding of the terms ‘innovation’ and ‘advancement’ when referring to seeds and varieties, and in turn, the expected time frames in breeding, as well as financing schemes and access to them. European seed and variety law itself manifests many aspects of prevalence. The view that farmers’ saved seeds are unsafe because their quality cannot be assured by experts led to the official annulment of the farmer’s privilege in 1997 (Bundestag, 1997; also Nozick, 1981), which granted every farmer the right to re-sow previously purchased seeds in the following year. These are only a few examples. The normative base needs to be open to identify these slight but manifold tipping points of power and take them into account when talking about actor’s capabilities. The two values *sovereignty* and *re-democratisation* are promising starting points for this enquiry.

Finally, *sovereignty* as a core value of this formulation of the capability approach, is also in place to critically consider (3) the socialisation of farmers and breeders. More specifically; societal influences which shape actor’s understanding of their profession, and which, consequently, might influence their personal conversion factors, and thus the functions they believe to be attainable, or which they are striving to achieve (also see problems of choice below). For example, when believing that farming means being a manager of agricultural inputs, rather than a creator of them, it is likely that the capability of being able to breed one’s own landraces does not seem attainable to the actor.

The normative grounding for seed commons as a normative theory of property regimes can be stated as: Things need to be organised in such a way that they are comprehensively open to satisfy actors’ needs for well-being, not fixed on the narrow function it was designed for, especially by enabling the creative attainment of three values important for the future of humanity, namely, sovereignty, re-democratisation and socio-ecological sustainability.



The capabilities on my list need to be in line with the normative grounding and should not contradict it. Reversely, the capabilities on the list must be able to capture the essences of the base values in the empirical study so an informed description can be given about which property regime is more promising for the realisation of people's values in goods and services for seeds and varieties.

### *Two problems of individual choice*

Two challenges arise from questions related to individual choice when aiming to apply the capability framework. One is whether it is realistic to assume that purely individual choices are possible, and if not, how to account for group or societal influences on actor's choices in a framework with a clearly individualistic point of view. The second question refers to Sen's prompt that each individual chooses his own set of valuable capabilities which stand for his or her understanding of well-being. That evokes problems of adaptive preferences (also described as self-censored choices), referring to the phenomenon that actors who have been socialised in a repressed environment tend to normalize their reality of life and will not report a capability as being desirable to them, although they are clearly deprived of it. For example, women in hunger-prone families are often systematically granted less food than the men in the household and suffer from undernutrition, yet they usually report to be fine and have sufficient nutrition (Nussbaum, 1988). So, the second question is: are self-referenced value capabilities the right means to determine the well-being of actors, when keeping in mind the possibility of adaptive preferences?

Both questions have been discussed to some length and merit by other scholars (e.g., Alkire, 2008; Kleine, 2013), so my short elaboration on the topic will be a summary of their thoughts.

### **(1) Individual and collective choice**

It is an idle thought to assume that individuals, even in democratic societies, are so detached from everything but their own free will, that their choices are purely individual, born out of their minds, independent of external influence. This external influence starts with small groups, like family and friends, but also includes the society the actor is embedded in, with its specific rules, values and collective beliefs. It becomes clear that every actor is in fact influenced by collectives and that this interconnectedness is an essential and (generally) positive facet of human life.

Critics accuse the capability approach of ontological and/or methodological individualism; the former implying that “society is built up from only individuals and nothing other than individuals, and hence is nothing more than the sum of individuals and their properties” (Robeyns, 2008) and furthermore, “that all social phenomena can be explained in terms of individuals and their properties” (ibid.). Neither reflect the intention of the capability framework. Alkire (2008) uses a reasoning of Robeyns (2008) to point out that some of the critique of Sen’s individualistic outlook as impossible due to social embeddedness, can be dismissed as a misunderstanding. The key lies in the differentiation between ethical, ontological, and methodical individualism. Sen would gladly agree to having an ethically individualist outlook, meaning that “individuals, and only individuals, are the ultimate units of moral concern” (Robeyns, 2008). But also “[t]his, of course, does not imply that we should not evaluate social structures and societal properties, but ethical individualism implies that these structures and institutions will be evaluated by virtue of the causal importance that they have for individuals’ well-being” (ibid.), in this way, social influences on the individual are acknowledged.

It is important to recognize that actors are not fully determined by outward structures. Giddens (1984) describes the mutual influence in individual-group relationships in his structuration theory. It is possible for actors to deviate from the predominant practices of the collectives they are influenced by and make genuinely individual choices. Furthermore, with their own influence on these collectives, they are able to change the collective’s practices to some degree. His outlook is a valuable addition to the capability approach in this research.

In practical application, that means that the individual with his or her own agency can remain the central entity of analysis, as long as influences from groups and society are acknowledged. Moreover, as the actors in seed economies are inevitably organised in groups (for the *RightSeeds* transdisciplinary partners for example, those are their breeding associations, Kultursaat e.V., MASIPAG and others; for the actors in the private property regime, it is their company and the market relations) and influenced by them, as well as external group interests, taking these influences into account enhances the quality of the research.

Kleine (2013, p. 32) sums up:

“Individuals may find that they can only achieve change for themselves by making choices collectively with others. Yet at the same time, each group is more than just a collection of individuals – relations between

individuals play a role, and often these relations come with power imbalances. [...] the individual, endowed with agency and embedded as a co-creator in their social structure, [can remain] the centre of analysis.”

## **(2) Adaptive preferences**

Adaptive preferences or self-censored choice describes “preferences shaped by oppression and deprivation” (Khader, 2009, p. 169). In a philosophically detailed debate, Khader points to several nuanced understandings of the term. Classically, adaptive preferences are understood as unconsciously constructed by individuals where they devalue opportunities that are unobtainable to them (Elster, 1987). Other scholars see no need for this process necessarily being unconscious, but rather involuntary. Adaptive preferences are then those which “persons did not choose to have — that is, preferences that are procedurally non-autonomous. [They are] not what people truly prefer, but what they have been ‘made to prefer’ (Teschl & Comim, 2005, p. 236),” (Khader, 2009, p. 169).

How to deal with the problem of adaptive preferences has been a disagreement between Sen and Nussbaum (Nussbaum, 2000; Sen, 1987, 1999). Nussbaum is concerned about Sen’s suggestion of developing a capability list for every research endeavour by engaging in a democratic process with the relevant participants in the field of research. Even if the participants would report the aspired beings and doings they have reason to value, due to adaptive preferences they are likely to give an incomplete account (Sen, 1987; Nussbaum, 2000; Begon, 2015).<sup>222</sup> Therefore, Nussbaum argues, self-reports and democratic proceedings are poor instruments from which to derive a list of essential capabilities. She believes that it is preferable to have a capability list designed by scholars in an act of philosophical reasoning. Kleine (2013) suggests addressing the problem by adding additional choice theories, which also show when actors are not aware of the full range of choices they could have.

How does this translate to the application of the capability approach in this work? It is relevant at two points of the research: drawing up the list of capabilities for seed commons and collecting qualitative data through self-reports.

In the early stage of the creation of the capability list, adaptive preferences are mediated through a multi-stakeholder approach. The list is derived from exist-

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222 Nussbaum also argues that any self-report of capabilities among the participants will go no further than being statements of desires, hence lacking the distinct qualities which make the capability approach stand out over Utilitarianism (Nussbaum, 1988, p. 38).

ing lists in scientific literature and then discussed with both the scientific community and a variety of international practitioners. Hence any existing adaptive preferences of individuals have a good chance of being evened out by the opinions of others. The aggregate assessments of all experts together should provide a holistic picture, especially as they have not all been socialised in the same way.

In the stage of empirical application, adaptive preferences might play a bigger role. Being aware of adaptive preferences, however, is in itself a means of partially preventing them from skewing the analysis. This is done by drawing special attention to the parameters of the actor's environment and how it might have worked to shape their beliefs, and by being alert to any capabilities they do not seem to think feasible for them or do not know about. Furthermore, the empirical individual statements can be referred to the broadly deliberated capability list for seed commons, which allows for identification of blind spots.



## Appendix F: Refinement of the Capability List for Seed Commons – Interview Directories

*Navdanya interview directory*

*(18.10.2018; about 1 hr., phone, interviewee: Mr. Drona Chetri. Navdanya's policy is to have individuals of their organisation named when agreeing to interviews)*

### Introduction

In my research I ask the question how different property regimes for seeds (private property and common property) influence the possibilities farmers and breeders have to use the seeds for their purposes and contribute to their well-being. I assume that farmers are happier if they have more options to use seeds in the way they want. And if they have more options, they should have higher well-being. I focus not on seeds narrowly, but look at their whole system of organisation, that means if they are organised as private property or in a common property regime.

Research question:

How do private property regimes or common property regimes of seeds and varieties enhance actors' well-being through the possibility of developing capabilities in conditions of scarcity?

⇒ Which capabilities are facilitated by the respective property regime?

Because I work in Germany, I mainly get information about seed activities here, in conditions of affluence. The interview with you will help me to include the perspectives of farmers in conditions of scarcity, because seeds are global and the issues farmers deal with might be very different. That way the framework I develop includes both perspectives.

If the interview participant has an academic background: Explain capabilities; otherwise I will just leave it out, because I deliberately don't use the term in the interview.

Do you have any further questions?

### **Preliminary question to ease into the interview:**

I want to start the interview by talking about the restrictions that seeds available on the market have for farmers and breeders.

- What got you interested in working with seeds / for Navdanya?
- You decided to build an alternative structure for the distribution of seeds among farmers and breeders. What can farmers and breeders not do with seeds available on the market that is important for them? [getting to the capability problems of private property]

### **Description of the Navdanya Common Property Regime for seeds**

[based on analytical framework for PR description; gather preliminary information to rather ask “Is it right that...” = yes/no questions]

Now I want to learn more about how seeds and varieties are handled in Navdanya. I read a lot about you in the literature, from case studies, etc. So it will only be a few questions for clarification.

- You are a farmers’ network. Do you work with breeders as well? Are any other people, e.g., researchers or advisors, organised in the network?
- Your main work is on rice. Do you share vegetable seeds as well? (Salad, Onion, Tomato, etc.)
- Who can join Navdanya to work with you and get seeds (get rights transferred to them)?
  - Only small-scale farmers who produce for their own needs and sale on local markets or also bigger farmers who produce for the world market?
  - If a new farmer wants to participate in Navdanya, can he fully join from the beginning?
- Farmers and breeders get seeds for free from you once a year before sowing and bring new seeds back after harvest. Are there other important steps the farmers and breeders do with the seeds in or for Navdanya?
- What (other) duties do farmers and breeders have who use your seeds?
- Do you have formal regulations to guide decisions about seed quality or which seeds to keep?
- Seeds are needed for the farmer’s work. What other, maybe bigger or more personal values do seeds have for farmers? (identity, tradition, ...)

*NOT: Society Dimension, Economy Dimension, Indian legal-political surrounding, etc.*

## Navdanyas perceived link of seeds and well-being

One question about farmer's happiness when they work with Navdanya.

- How do you think your seeds are related to your farmers' well-being?

### **Discussion of the Capability List (analytical frame): What are farmers able to do with the Navdanya seed commons?**

Now let's talk about why farmers use Navdanya seeds. More specifically, what is important for the farmers when using seeds. Also which abilities they get from participating in the Navdanya seed community. I will ask questions about four main areas of seed use: (1) being in control of the own future economically and politically, (2) connecting with people and nature, (3) being healthy and (4) fulfilling own goals. We always talk about the Navdanya seed commons, so not only the seeds, but also the Navdanya community, the knowledge sharing and the whole organisation around that [*make sure that seed commons as a wider construct is clear*].

This list of questions is rather long; I apologize in advance. But I want to get a comprehensive / detailed picture of what seeds mean to farmers, without missing important aspects. Don't worry though, it is the last set of questions in the interview.

- How is the use of seeds from Navdanya positive or negative for farmers in
  - having control over their actions and economic future [C6]?
  - participating in politics and influence political decisions [C7]?
  - getting more knowledge [C9]?
  - being better at their jobs [C10]? Is that important for them?
  - being creative and think critically [C11]?
  - staying healthy (in (a) body [C1] and (b) mind [C2])?
  - getting support and respect from others [C3]?
  - understanding the plants well and care for them on a personal level [C4]?
  - finding a higher meaning in life, maybe connected to religion [C5]?
  - deciding about their own leisure time [C8]?
  - finding beauty in their work and life [C12]?
- If needed: Is this not important at all?
- Is something missing that farmers like or dislike about the Navdanya seed commons?
- Is there anything farmers would like to do with seeds that is not possible for them when they participate in the Navdanya seed community? [Points towards transaction costs, etc.]



## **Last questions**

- What makes you especially proud about Navdanya’s work?
  - Is there anything else you would like to add?
  - Do you have any other questions about the interview, regarding content or formalities?
- 

## **Background to the Navdanya interview: construction of this interview directory**

This interview serves a double purpose: it should (a) evaluate my capability list from the perspective of common property regime seeds in conditions of scarcity and (b) give insights into the actual capabilities achieved by farmers in conditions of scarcity through their seed use.

Therefore, the interview (1) extracts a description of the Navdanya common property regime seed system, based on the analytical property regime framework I sketch in Appendix C and (2) evaluates the capability list for seed commons in an early stage by asking about their embodiment in the Navdanya seed practice. This will first indirectly evaluate the fit of the capabilities on the list and then directly ask if any of the abilities discussed seem superfluous or irrelevant, wrongly understood, or if something was missing. In the last question (3) a subjective assessment of the farmers’ well-being using Navdanya seeds was asked for. This question serves two purposes: it gives a rough estimation of the influence of seeds in common property regimes for farmer-breeders’ well-being, but it also serves as an indicative question for possible socially desirable answers, if the response turns out to be particularly positive and/or heavily overestimating the influence of seeds on the very complex life realities of persons.

The interview acquisition, and formulation of the interview directory draws mainly on the suggestions of Gläser and Laudel (2010). For the acquisition, a formal, preliminary e-mail was sent to the organisation asking for an interview and providing details of my research, the goal of the interview and the planned length of one hour. A few days later, a follow up phone call was tried, but failed due to issues with foreign calls. So, the interview was fixed via mail. I endeavoured to use mostly open questions to avoid suggestive questioning, except for the property regime description, where I often combined preliminary knowledge with closed questions to confirm knowledge about Navdanya from literature. I did this because I suspected the topic to be too broad, and I wanted to avoid over-emphasis on this area, which might compromise the second part

of the interview – the discussion of the capability list – in terms of time management. Furthermore, the questions were formulated to be neutral, clear, and as simple and colloquial as possible, to avoid misunderstanding, especially as this interview was conducted between two unfamiliar non-native English speakers via phone. That meant, for example, that the term *capabilities* was not used during the interview, but always asked for more descriptively (“what can farmers do with seeds”, “which abilities do they have”, ...). The questions were placed in this order to have one simple question to ease into the interview, then gain understanding of the more basic of the two interview parts, the Navdanya seed property regime, where it is assumed the participant has solid knowledge and feels at ease in the area. The next block of questions then discusses the more complex and theoretical capability list, and a final question finishes on a positive note, followed only by the option for the participant to ask some concluding clarifying questions themselves.

Gläser, J., & Laudel, G. (2010). *Experteninterviews und qualitative Inhaltsanalyse als Instrumente rekonstruierender Untersuchungen* (4. Auflage). Wiesbaden: VS Verlag.

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## The Navdanya interview inquiry

Dear Navdanya team,

my Name is Nina Gmeiner, I am a researcher and PhD student in the project *RightSeeds? – Commons-based rights on seeds and cultivars for a social-ecological transformation of plant production* at the University of Oldenburg (Germany). The project focuses on vegetable seeds.

Although it is widely acknowledged that seeds are an essential building block of food sovereignty, their role for the well-being of farmers and breeders has not been researched yet. I ask the question how different property regimes for seeds (private property and common property) influence the possibilities farmers and breeders have to use the seeds for their purposes and contribute to their well-being. I hope that my findings will provide new arguments for seeds as Commons (seed banks, seed cooperatives, ...).

For this, I would like to conduct an interview with you to include perspectives of seed activism in conditions of scarcity. I suspect that you know a lot about specific needs and values of small scale farmers and I would like to include these insights into my research framework, so it will not just be centered on western countries.

With your permission I will contact you via phone in the next days to talk about a possible interview partner and a date for a one-hour online or phone interview.

Kind regards,

Nina Gmeiner

## Conventional Seed Company

Interviewleitfaden I5 (08.11.2018; ca. 1 Std.)

### Einführung

Meine Arbeit beschäftigt sich mit der Frage, wie sich verschiedene Eigentumsregime für Saatgut und Sorten (Privateigentum bzw. Gemeingut) auf die Handlungs- und Entfaltungsmöglichkeiten von Züchtern und Landwirten, und damit ihr Wohlergehen, auswirken. Ich arbeite dabei mit dem Befähigungsansatz von A. Sen, der davon ausgeht, dass mehr Möglichkeiten im Umgang mit Ressourcen zu mehr Befähigungen der Akteure führen und damit zu gesteigertem Wohlergehen beitragen. Für diese Analyse betrachte ich Saatgut und Sorten nicht nur in ihrer materiellen Dimension als Güter, sondern sehe mir ihr ganzes Organisationssystem an. D. h. ob sie als Privateigentum oder Gemeingut organisiert sind und wie diese Organisationsformen genauer aussehen.

Forschungsfrage:

Inwiefern hat die Organisation von Saatgut und Sorten (als Privateigentum oder Gemeingut) einen Einfluss auf das Wohlergehen von Züchtern und Landwirten durch die Ermöglichung verschiedener Befähigungen?

➔ Welche Befähigungen werden in dem hier betrachteten Eigentumsregime begünstigt / ermöglicht?

Das Forschungsprojekt ist auf eine Erforschung der potenziellen wirtschaftlichen, gesellschaftlichen und ökologischen Bedeutung von Saatgut als Gemeingut ausgerichtet. Für meine Doktorarbeit möchte ich jedoch Aussagen für verschiedene Organisationsformen treffen können. Deshalb bin ich über Ihre Geschäftsleitung an Sie als Expertin für Zucht in einem etablierten Unternehmen herangetreten.

Haben Sie bis hierhin noch Fragen?

### **Eine leichte Fragen zum Anfang:**

– Wie sind Sie zu dem Unternehmen gekommen?

### **Beschreibung des hier betrachteten Privateigentumsregimes für Saat & Sorten**

[basierend auf meinem analytischen Framework für die Beschreibung von Eigentumsregimen]

- Grundlegende Informationen zur Gemüsesparte des Unternehmens:
  - ungefähre Anzahl von Züchter\*innen und deren Ausbildung/Hintergrund (Uni, Ausbildung, Quereinsteiger\*innen)
  - grobe Anzahl der Sortenanmeldungen pro Jahr und für welche Kulturen
  - verwendete Zuchtverfahren
  - grobe Zielgruppen im Verkauf
- Kriterien bei der Auswahl des Zuchtmaterials [zugrundeliegende Werte der Arbeit]
  - Was ist Ihnen dabei wichtig?
  - Gibt es auch Situationen, wo ein\*e Züchter\*in aus eigener Begeisterung eine Sorte züchtet, auch wenn sie wirtschaftlich evtl. nicht prioritär ist?
  - Züchten die Züchter\*innen auch privat?

## **Wahrgenommener Beitrag der Sorten zum Wohlergehen von Akteuren:**

- Inwiefern glauben Sie, dass die von Ihrem Unternehmen entwickelten Sorten zum Wohlergehen / der Freude von (a) Züchtern (selbst und andere) und (b) Landwirten beitragen?

## **Diskussion der Capability List (analytischer Rahmen): Was für Handlungsmöglichkeiten und Befähigungschancen haben Züchter und Landwirte mit den Sorten Ihres Unternehmens?**

Nun geht es darum, warum Züchter und Landwirte Ihre Sorten nutzen. Genauer: Was ist Züchtern und Landwirten Ihrer Erfahrung nach wichtig, wenn sie Saatgut und Sorten nutzen? Dabei geht es, wie vorher kurz erwähnt, auch um weitere Angebote Ihres Unternehmens oder Netzwerkpartnern, die mit der Nutzung Ihres Saatguts verbunden sind – z. B. Versuchsgarten, Weiterbildungsangebote, ... Sowie dem empfohlenen Anbausystem. [*Sicherstellen, dass klar ist, dass es nicht nur eng um Saat als materielle Ressource geht*]

Ich stelle gleich Fragen über vier Hauptbereiche, die im Zusammenhang mit der Nutzung von Saatgut und Sorten relevant sein können. Wie in meiner vorangehenden Mail erwähnt, habe ich diese Befähigungsliste für die gesamte, globale Saatgutnutzung erstellt. Sollte eine Befähigung für Sie also überhaupt nicht relevant sein, sagen Sie mir das ruhig.

Die Bereiche sind

1. ökonomische und politische Kontrolle über die eigene Zukunft haben,
2. Bezug oder Verbindung zu Mitmenschen, Lebewesen und Natur haben,
3. körperlich und geistig gesund sein und
4. eigene Ziele erfüllen können.

Diese Liste von Fragen ist eher lang und könnte etwas ermüdend werden. Dafür entschuldige ich mich schon einmal im Voraus. Weil ich mir aber ein umfassendes Bild davon machen möchte, was Saatgut und Sorten für Züchter und Landwirte bedeuten (können), ließ sich das nicht vermeiden. Das ist der Hauptteil des Interviews, danach ist es dann auch schon fast vorbei.

- Inwiefern ist die Nutzung von Sorten Ihres Unternehmens für Züchter und Landwirte positiv in Bezug darauf:
  - Kontrolle über ihre eigene wirtschaftliche Zukunft zu haben [C6]?
  - politisch Einfluss nehmen zu können [C7]?
  - Wissen zu erwerben oder sich Fortzubilden [C9]?
  - besser in Ihrem Beruf zu werden (Exzellenz anzustreben, breiteres Aufgabenfeld, ...) [C10]? Ist das den Akteuren wichtig?

- Kreativ sein zu können und kritisch zu denken [C11]?
  - körperlich und geistig gesund zu sein [C1 & C2]?
  - Unterstützung und Respekt von anderen zu erfahren [C3]?
  - Verständnis für die verwendeten Pflanzen zu entwickeln und eine persönliche Bindung zu ihnen aufzubauen [C4]?
  - Sinnstiftung im Leben zu erfahren oder spirituell zu wirken [C5]?
  - über ihre eigene Zeit bestimmen zu können [C8]?
  - Ästhetik wahrzunehmen [C12]?
- Fehlt etwas in der Liste?
  - Glauben Sie, dass die Züchter Handlungsmöglichkeiten / Befähigungschancen in ihrer Arbeit mit Saatgut und Sorten vermissen?
  - Glauben Sie, dass die Landwirte Handlungsmöglichkeiten / Befähigungschancen in ihrer Arbeit mit Saatgut und Sorten vermissen?

### **Abschließende Fragen**

- Was begeistert Sie an Ihrer Arbeit?
- Möchten Sie diesem Interview noch irgendetwas hinzufügen? Wurde etwas Wichtiges vergessen?
- Haben Sie noch Fragen zum Interview, inhaltlich oder formell?

**Leitfaden Expertengespräche  
– CAPABILITY LISTE FÜR SAATGUT & SORTEN –**

**ZIEL:**

Herausfinden, ob die identifizierten Capabilities für Saatgut und Sorten Sinn machen

Ob alle relevanten Aspekte berücksichtigt wurden

Ob bestimmte Aspekte von den Praxis-Experten als nicht relevant wahrgenommen werden

**HERGANG:**

1. Erklären, was die Capability Liste bewirken soll (einfache Worte, gut aufeinander aufbauend, evtl. komplett vorformulieren)
2. Auch kurz darstellen, wer noch interviewt werden wird, dass die Capabilities auch noch mit der wissenschaftlichen Community diskutiert werden und wofür die Liste im Nachhinein Verwendung finden soll
3. Forschungsfrage nochmal vorstellen, kurz vor der Diskussion und das Ziel des Interviews
4. Liste vorstellen und einzelne Aspekte erklären
5. Mit den Praxis-Experten im Detail diskutieren
6. Nochmal nachfragen: Fehlt ein bestimmter Aspekt?
7. Nochmal nachfragen: Scheint ein Aspekt nicht relevant?
8. Nochmal nachfragen: Sollte etwas umformuliert / ergänzt / anderer Schwerpunkt gelegt werden?

**Was soll die Capability Liste bewirken?**

Ich gehe in meiner Arbeit davon aus, dass Wirtschaft kein Selbstzweck ist (die Anhäufung von immer noch mehr Gütern und Reichtum), sondern Mittel zum Zweck um den Menschen einer Gesellschaft ein zufriedenes / gutes / erfüllendes Leben zu ermöglichen, also größtmögliches Wohlbefinden.

Verschiedene Studien haben über die letzten Jahrzehnte gezeigt, dass materieller Wohlstand nur zu einem Teil, bzw. bis zu einem bestimmten Schwellenwert zu diesem guten Leben jedes Einzelnen beiträgt. Andere Faktoren, wie

soziale Bindungen und die Fähigkeit, sich selbst zu verwirklichen, spielen auch eine wichtige (teils noch wichtigere) Rolle.

Ich verwende eine Theorie in meiner Arbeit, die *Capability Approach* heißt, zu Deutsch *Befähigungsansatz*. Befähigungen bezeichnen alle Fähigkeiten und Zustände, welche Menschen erreichen und erstrebenswert finden können. Also z. B. den Zustand keinen Hunger zu leiden oder die Fähigkeit lesen zu können; aber auch abstraktere, wie die Fähigkeit, einer sozialen Gruppe zugehörig zu sein. Der Ansatz geht dann davon aus, dass jedem Menschen die Möglichkeiten gegeben werden sollten, jene Fähigkeiten und Zustände zu erreichen, die für ihn oder sie Wohlbefinden und Lebenszufriedenheit bedeuten.

Im Befähigungsansatz haben Güter deshalb nur instrumentellen Wert, d. h. sie sind nur Mittel zum Zweck, steigern aber nur durch ihren Besitz nicht das Wohlbefinden des Besitzers. Ein Fahrrad würde das Wohlbefinden z. B. nur steigern, weil die Besitzerin damit von A nach B fahren kann oder weil sie durch das Rad Freunde und Familie besuchen kann. Viele Güter erfüllen auch mehrere Bedürfnisse, z. B. Brot. Zum einen ermöglicht es seinem Besitzer satt zu werden, es kann aber auch als wichtiger, kultureller Teil einer Feier das Bedürfnis des Besitzers nach sozialem Zusammenhalt befriedigen.

Güter können also mehr, als nur einen bestimmten Verkaufswert zu haben. Im Idealfall ermöglichen sie es ihren Besitzern vielfältige Fähigkeiten und Zustände zu erreichen – und sich so nach eigenen Vorstellungen zu entfalten. **Für Saatgut und Sorten habe ich deshalb** (mit Hilfe von Vergleichen zu ähnlicher Forschung) **eine Liste von Befähigungen entwickelt, welche Saatgut und Sorten ihren Besitzern ermöglichen können.** Dabei lege ich besonderen Augenmerk auf die Organisationsweise: werden die Sorten als Gemeingut verwaltet oder sind sie privatisiert? Und was bedeutet das für die Befähigungen ihrer Besitzer und Verwender (also Züchter und Landwirte)?

Letzteres ist die Hauptfrage meiner Arbeit.

War die Einleitung verständlich, oder soll ich einzelne Aspekte nochmal erklären?

### **Warum das Interview, wer wird noch interviewt und wofür brauche ich die Liste nachher?**

Mit Ihnen möchte ich mir die Liste nun ansehen, weil Sie als Experte eine gute Sicht auf die Landwirte oder / und Züchter haben und aus Ihrer Erfahrung einschätzen können, was diese besonders an Saatgut und Sorten schätzen, bzw. was ihnen besonders wichtig ist, wenn sie Saatgut kaufen. Das können Dinge



sein, die sie direkt gesagt haben oder auch Bedürfnisse, die Sie aus Ihrer Erfahrung wahrgenommen haben (und die vielleicht nicht offen erzählt wurden).

Ich werde auch noch mit weiteren Experten reden, um am Ende jeweils eine Sicht von einem Züchtervertreter und einem Landwirtevertreter für Gemeingut und für Privateigentum zu haben. Weil ich die Eigentumsformen vergleichen möchte, diskutiere ich mit Vertretern beider Seiten.

Mit der nach den Diskussionen angepassten Liste kann ich dann ab Ende diesen Jahres meine Haupt-Erhebungen mit Züchtern und Landwirten durchführen.

In einem weiteren Schritt passe ich nach der Praxissicht meine Liste an Verwirklichungschancen nochmal an und diskutiere sie dann mit der wissenschaftlichen Gemeinschaft, die auch mit dem Befähigungsansatz (also meinem Theoriegerüst) arbeitet.

Danach habe ich eine Liste, die wissenschaftlich und praktisch sinnvoll ist und mit der ich meine eigentliche Forschung beginnen kann.

### **Forschungsfrage (nochmal) und Ziel des Interviews**

Ich möchte mit meiner Arbeit herausfinden, welche Verwirklichungschancen Landwirte und Züchter durch Saatgut und Sorten bekommen. Also welchen Zwecken Saatgut und Sorten neben der wirtschaftlichen Verwendung (Einsäen und Ernten, Weiterzüchten) noch dienen können (sozial, für Selbstverwirklichung, gesundheitlich, spirituell, ...). Vor allem vergleiche ich dabei, welche Unterschiede es macht, ob Saat und Sorten als Gemeingut oder als Privateigentum verwaltet werden – es gibt derzeit ja beides.

Eventuell kann sich daraus ein starkes Argument für die eine oder andere Art der Verwaltung von Saatgut und Sorten ergeben – und es ist ein Ansatzpunkt für die Frage, welche Dinge vielleicht besser als Gemeingut für alle zur Verfügung gestellt werden sollten und unter welchen Umständen und welche als Privateigentum.

Mit der fertig diskutierten Liste führe ich dann ausführliche und viele Gespräche mit Züchtern und Landwirten. Einmal im globalen Norden und im globalen Süden und hier in Deutschland auch mit Landwirten und Züchtern aus der Privatwirtschaft. Die Daten werte ich dann aus.

Das Ziel des Interviews heute ist es also, die Liste von Verwirklichungschancen kritisch anzugucken und ggf. zu verändern, bis ich damit sinnvoll die

Fähigkeiten der Landwirte und Züchter für den Umgang mit Saatgut und Sorten erfragen kann. Ohne dass Lücken bleiben oder irrelevante Themen abgefragt werden.

Gibt es so weit noch Fragen?

### **Liste vorstellen und einzelne Aspekte erklären**

Sonst lese ich Ihnen jetzt die Liste einmal vor. Es gibt 11 Befähigungen, die ich mir für Saatgut und Sorten als relevant vorstellen kann und ich habe sie jeweils in 4 Unterkategorien eingeteilt: Gesundheit, Gefühle von Verbundenheit, Kontrolle über das eigene Umfeld / Sicherheit, sowie persönliches Wachstum / Chancengleichheit.

Ich spreche die einzelnen Befähigungen erst einmal mit Ihnen durch und wir können Fragen klären. An den Stellen, an denen Ihnen etwas aufgefallen ist, möchte ich dann gemeinsam mit Ihnen diskutieren:

- a. Ob die Kategorien sinnvoll gewählt wurden und in sich stimmig sind
- b. Ob etwas nicht berücksichtigt wurde
- c. Ob etwas umformuliert werden sollte, ein anderen Schwerpunkt gelegt werden sollte, etc.
- d. Ob ein Aspekt nicht relevant ist
- e. Welche drei Aspekte aus der Liste Ihnen am wichtigsten scheinen

### **Liste von Verwirklichungschancen für Züchter und Landwirte durch Saatgut und Sorten (19.01.2018, deutsche Übersetzung)**

#### **Gesundheit**

1. Leben, körperliche Unversehrtheit und angemessene Ernährung (Menge und Art):

Ist diese Verwirklichungschance gegeben, kann die Person körperlich Unversehrt bleiben, ein Leben von normaler Länge genießen und erwünschte Nahrung in ausreichender Menge erlangen. Dieser Aspekt beinhaltet auch die Möglichkeit ein in einem sicheren und erfreulichen Umfeld zu leben. (Nussbaum, 2003; Robeyns, 2003)

Für Saatgut und Sorten bedeutet das vor allem, einen praktischen und rechtlichen Zugang zu den Sorten zu haben, die man (aus wirtschaftlichen, kulturellen, gesundheitlichen, ernährungsphysiologischen, ... Gründen) gerne verwenden möchte. Hierbei spielt auch das Bedürfnis der Sorte nach dem Einsatz potenziell gesundheitsgefährdender Pestizide eine Rolle.

2. Geistiges Wohlbefinden und Abwesenheit innerer Konflikte:

Die Fähigkeit, geistig gesund zu sein und in innerem Frieden (ohne emotionale und moralische Konflikte) zu leben (Grisez et al., 1987; Robeyns, 2003)

Das beinhaltet, keine (Zukunfts-) Ängste in Bezug auf Saatgut und Sorten zu haben (wirtschaftlich / preislich, qualitativ, Zugang, Ertrag ...; beinhaltet auch daraus folgende Investitionen: Pflanzenschutzmittel, Maschinen, ...) und Zugang zu Sorten zu haben, die den eigenen Wertvorstellungen entsprechen.

## **Gefühle von Verbundenheit**

3. Soziale Beziehungen und Respekt:

Beschreibt die Möglichkeit der Person, ein Teil sozialer Netzwerke zu sein und Unterstützung zu erhalten und zu geben. Darüber hinaus respektiert zu werden und in Würde leben zu können. Dazu gehören auch vielfältige Möglichkeiten am Sozialleben teilzunehmen (Nussbaum, 2003; Robeyns, 2003)

Die Landwirte und Züchter sollten für ihre Arbeit Anerkennung und Wertschätzung erhalten können. Saat und Sorten und ihre Organisation können auch die Fähigkeit fördern soziale Unterstützung zu erhalten und zu geben.

4. Beziehungen zu anderen Spezies und der Natur:

Hier ist die Fähigkeit gemeint, mit Rücksicht auf und in Beziehung mit Tieren, Pflanzen und der Natur an sich zu leben; das kann eine lebendige und spirituelle Beziehung zur Natur beinhalten und schließt einen gleichwertigen und gerechten Umgang mit seiner Umwelt ein (Nussbaum, 1995, 2000, 2003)

In der Züchtung kann das eine emotionale oder anderweitig außergewöhnliche Beziehung zu Saatgut und Sorten bedeuten. Es beinhaltet eine evolutionäre Perspektive auf die Züchtung und keine manipulative.

5. Transzendenz und Religion:

Beschreibt die Möglichkeit zu wählen, ob man nach einer Religion leben möchte oder nicht und generell die Chance sich mit einer übernatürlichen, sinngebenden Quelle in Verbindung zu setzen (Grisez et al., 1987; Robeyns, 2003)

Das beinhaltet die Freiheit Saatgut und Sorten als spirituelle Güter zu betrachten und zu gebrauchen.

## **Kontrolle über das eigene Umfeld und Sicherheit**

### 6. Kontrolle über die eigene, wirtschaftliche Zukunft:

Die Möglichkeit, sich selbst ohne Sorgen durch seine Einkommensquelle(n) zu finanzieren; das beinhaltet unter Umständen die Möglichkeit, souverän über die eigenen Produktionsmittel (u. a. Saatgut und Sorten) zu verfügen. Generell die Möglichkeit Eigentum zu besitzen oder gesicherten Zugang zu den Produktionsmitteln zu haben (im Unterschied zu Nussbaum, 2003 geht es um gesicherten Zugang, nicht unbedingt Eigentum), gleichwertig mit den Mitmenschen.

Es geht in diesem Aspekt um Ernährungssouveränität in Bezug auf Saatgut und Sorten, also u. a. die Möglichkeit des Nachbaus und der Weiterzucht. Dazu gehört auch die Abwesenheit von Angst vor Verfolgung durch Wirtschaftsakteure und der Zugang zu allen notwendigen Produktionsmitteln für Anbau, Nachbau und Zucht.

### 7. Politische Beteiligung:

Die Möglichkeit, effektiv an politischen Entscheidungen teilzuhaben, die das eigene Leben betreffen (Nussbaum, 2003; Robeyns, 2017)

Ein angemessenes Maß an Einfluss auf politische Entscheidungen, die die Themen Saatgut und Sorten, sowie Zucht und Landwirtschaft allgemein betreffen. Auch die Kontrolle über die Produktionsmittel sind zu großen Teilen politisch. Der Zusammenschluss verschiedener Akteure in einem Saatgutssystem kann als einflussreiche Interessensvertretung für die einzelnen Züchter und Landwirte wirken und den Akteuren ein Gefühl von politischer Ermächtigung geben.

## **Persönliches Wachstum, Chancengleichheit und Machtverteilung**

### 8. Bildung und Wissen:

Die Möglichkeit zu haben, Bildung zu genießen und Wissen zu gebrauchen und zu produzieren (Robeyns, 2003)

Dies wird bei Saatgut und Sorten durch einen transparenten Züchtungsprozess ermöglicht und die Weitergabe von Zucht- und Anbauwissen generell.

### 9. Eine bestimmter Grad an Vortrefflichkeit in Arbeit und Spiel:

Zu dieser Verwirklichungschance gehört die Möglichkeit eigene Projekte zu realisieren (praktisch und künstlerisch), sowie sinnhaft zu handeln und eigene Ziele und Zwecke zu verfolgen. Speziell für die Arbeit schließt das auch die Nutzung der eigenen, praktischen Vernunft mit ein und die Möglichkeit, bedeutsame Beziehungen in gegenseitiger Anerkennung mit anderen Akteuren einzugehen (Grisez et al., 1987; Nussbaum, 2003; Robeyns, 2017)

Die Akteure sollen in der Lage sein, Saatgut und Sorten so zu nutzen, dass sie es als sinnhaft empfinden und sich innerhalb ihres Arbeitsbereichs verwirklichen können (z. B. durch eine große Bandbreite an Arbeitsinhalten oder durch als sinnhaft empfundene Arbeitsbeziehungen). Das beinhaltet auch das Gefühl, Perfektion in seinem Arbeitsbereich erlangen zu können.

10. Sinn, Phantasie und Nachdenken:

Die Möglichkeit, seine Sinne zu gebrauchen, sich Gedanken zu machen, zu fantasieren und logische Schlüsse zu ziehen, also insgesamt kreativ zu sein (ermöglicht durch angemessene Bildung). Weiterhin die Fähigkeit Werke und Veranstaltungen aus eigener Kraft und aus eigener Entscheidung heraus zu kreieren, seien diese politisch, religiös, sozial, musikalisch, ... (Nussbaum, 1995, 2000, 2003)

Die Möglichkeiten zur Kreativität durch Zucht oder verschiedene Anbaumethoden, sowie das dafür nötige Hintergrundwissen. Außerdem die Fähigkeit, das so Entstandene in selbst gewählten Formaten mit anderen Akteuren zu teilen.

11. Fähigkeit für ästhetisches Erleben:

Die Möglichkeit der Anerkennung von Schönheit (Grisez et al., 1987) Diese Fähigkeit kann das Empfinden der Schönheit von einzelnen Sorten oder der Biodiversität als Gesamtem beinhalten. Auch die Schönheit einer bestimmten Art von Zucht (also dem Arbeitsinhalt oder bestimmten Arbeitsschritten) und die Schönheitserfahrung der Arbeit mit der Natur.

## **Appendix G: Main Interview Directories**

### *Germany*

#### **Interviewleitfaden KS Züchter – Deutschland 2019**

Interviewleitfaden: Experteninterviews mit Züchtern der gemeingutbasierten Initiative Kultursaat

[Ansprache klären;

Vorher knapp RS als Projekt und unser Verständnis von Saatgut als Gemeingut erklären.]

#### **Einstieg**

1. Wie kamen Sie zum Verein Kultursaat und welche Aufgaben übernehmen Sie dort?
2. Was haben sie für einen Hintergrund in der Züchtung und Landwirtschaft?

#### **Capabilities – Arbeit mit gemeingutbasiertem Saatgut / Sorten**

3. Wie beeinflusst diese Arbeit Ihre Kontrolle über die eigene, wirtschaftliche Zukunft?
4. Wie beeinflusst diese Arbeit die wirtschaftliche Zukunft anderer Landwirte?
5. Wie beeinflusst diese Arbeit Ihren Einfluss auf politische Entscheidungen (zu den Themen Saatgut und Züchtung)?
6. Welches Wissen bekommen und geben Sie mit dieser Arbeit?
7. Inwiefern lässt diese Arbeit Sie in Ihrem Beruf besser werden? Ist das persönlich wichtig für Sie?
8. Inwiefern beeinflusst diese Arbeit Ihre Kreativität und Ihr kritisches Denken?
9. Wie beeinflusst diese Arbeit Ihre (körperliche) Gesundheit?
10. Wie beeinflusst diese Arbeit Ihre Sorgen und ihren Stress (geistige Gesundheit)?
11. Inwiefern bekommen Sie durch diese Arbeit Respekt und Unterstützung von anderen?

12. Inwiefern entwickeln Sie durch diese Arbeit eine persönliche Verbindung zu Pflanzen?
13. Inwiefern sind Saatgut/Sorten und Pflanzen wichtig für Sie in Bezug auf Spiritualität und / oder Glauben?
14. Inwiefern bringt diese Arbeit Schönheit in Ihr Leben?
15. Welche drei dieser Aspekte sind die wichtigsten für Sie? [Chart!]
16. Welcher dieser Aspekte ist am wenigsten relevant?

### **Forderungen**

17. Welche Einschränkungen sehen Sie (z. B. regulativ, politisch, gesellschaftlich) für Ihre Arbeit?
18. Was würden Sie gerne mit Saatgut oder Sorten tun, dürfen es aber nicht?

### **Herausforderungen und Ausblick**

19. Was sind derzeit und zukünftig die größten Herausforderungen für Kultursaat?
20. Welche Entwicklungen bei Kultursaat erwarten Sie in den nächsten 10–15 Jahren?
21. Welche Rolle spielt Ihre Arbeit in Zukunft?

## *Philippines I*

### **Interview Directory – MASIPAG farmer-breeders**

#### **1) Handling of seeds**

Please describe your handling of seeds:

##### **i. Getting seeds:**

From where do you get your seeds?

Do you buy your seeds or get them for free?

##### **ii. Sowing seeds:**

How do you sow your seeds? (machines or not)

How do you prepare your seeds before sowing them?

Do you sow one or more varieties in a field?

##### **iii. Use of agrochemicals:**

How do you use fertilizers and pesticides?

##### **iv. Harvesting & saving seeds:**

How do you harvest your seeds?  
How do you save your seeds for the next season?  
Where do you store your seeds?  
How do you prepare your seeds before storing them?

v. Giving seeds away:

How do you share your seeds?  
Who do you share your seeds with?  
If you share them: Do you sell them or give them away for free?

**2) Capabilities**

- a. How does working with MASIPAG's seeds influence your income?  
How does it impact your control over your economic future?
- b. How can you participate in political decisions with MASIPAG's help?
- c. What knowledge do you get and give working with MASIPAG? How do you get more knowledge with MASIPAG?
- d. How do you become a better farmer and breeder with MASIPAG's help? Is this important for you?
- e. Which new ideas did you have about farming and breeding since working with MASIPAG? Do you enjoy breeding yourself?
- f. How does working with MASIPAG influence your health?
- g. How does working with MASIPAG influence your stress and worries, relaxation?
- h. How can you get support and respect from others when working with MASIPAG?
- i. How does working with MASIPAG give you a more personal connection to plants?
- j. How are seeds and plants important for your religion or spiritual belief?
- k. How does working with seeds bring beauty into your life?
- l. Which 3 of these aspects are most relevant to you in your work with MASIPAG? [create a chart]
- m. Which aspects do you not find relevant at all?

**3) Claims**

What would you like to do with seeds, but you are not allowed to?



**Interview Directory – MASIPAG coordinators and staff**

**1) Capabilities**

- a. How does working with MASIPAG's seeds influence the income of farmers? How does it impact their control over their economic future?
- b. How does MASIPAG help farmer-breeders to participate in political decisions?
- c. What knowledge do farmer-breeders get and give working with MASIPAG? How do they get more knowledge with MASIPAG?
- d. How do farmer-breeders get better at their job with MASIPAG's help? Is this important for them?
- e. How does working with MASIPAG foster the creativity and critical thinking of farmer-breeders?
- f. How does working with MASIPAG influence the physical health of farmer-breeders?
- g. How does working with MASIPAG influence the psychological health of farmer-breeders? (stress and worries, relaxation and trust in the future)
- h. How do farmer-breeders get support and respect from others when working with MASIPAG?
- i. Do MASIPAG farmer-breeders have a personal connection to plants?
- j. How are seeds and plants important for the farmer-breeders' religion or spiritual belief?
- k. How does working with MASIPAG seeds bring beauty into farmer-breeder's work and life?
- l. Which 3 of these aspects are most relevant for MASIPAG? [create a chart]
- m. Which aspects do you not find relevant at all?

**2) Claims**

What are legal restrictions to MASIPAG's work with seeds?

What would you like to do with seeds, but you are not allowed to?

## **Appendix H: Case Studies – Interview Transcriptions**

All interview transcriptions (MASIPAG: English; Kultursaat e. V.: German) are accessible via the following link:

<https://cloudstorage.elearning.uni-oldenburg.de/s/ScmT6dKQMfFqoL6>